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EDUCATIONAL BULLETIN

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COURSES OF STUDY IN AGRICULTURE

AND

MINIMUM OF REQUIRED EQUIPMENT

FOR THE

FARM-LIFE SCHOOLS

OF

NORTH CAROLINA

---

ISSUED FROM  
THE OFFICE OF STATE SUPERINTENDENT OF  
PUBLIC INSTRUCTION

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RALEIGH, N. C.  
EDWARDS & BROUGHTON PRINTING CO.  
STATE PRINTERS AND BINDERS  
1915



Hodson, Edgar Allan, 1884

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## PREFACE

The law directs that the course of study and the equipment of all Farm-Life schools shall be subject to the approval of the State Superintendent of Public Instruction. This bulletin contains the courses of study in agriculture and related subjects and the minimum of general equipment for these schools that will be approved by him. It also contains suggested additional equipment needed for work in the special departments and suggested text-books, reference books, and lists of books and bulletins for the library.

It would be neither economical nor wise to start one of these schools without the minimum of equipment found by experience, by careful investigation, and by consultation with experienced teachers and experts in other schools of this sort to be necessary for the successful teaching and training required of such schools. Therefore the minimum general equipment contained herein, together with the other equipment in buildings, laboratories, land, etc., designated by the law, must be provided by each school before the State Superintendent will recommend the State apportionment by the State Board of Education for its maintenance.

More than a year ago Prof. E. A. Hodson, of the Department of Agronomy of the North Carolina College of Agriculture and Mechanic Arts, was employed to take charge of the preparation of this bulletin. In the preparation of the bulletin he has carefully examined the courses of study in similar schools in this and all other states. He has conferred with the members of the Committee on Vocational Education of the Department of the High School Principals of the North Carolina Teachers' Assembly, receiving valuable suggestions and criticisms from time to time from the members of that committee; he has consulted experienced and successful teachers of agriculture and kindred subjects in this and other states; he made a special visit to Cornell University, to get the benefit of the great library and the assistance of noted specialists in agricultural instruction there in the preparation of the courses of study and in compiling the lists of books and of the suggested equipment. During the year he has visited most of the Farm-Life schools in this State and observed their work. During the summer of 1915, in a conference in my office with the principals and teachers of agriculture, and the heads of the departments of Home Economics of these Farm-Life schools, the courses of study and the equipment for these schools were discussed and criticised, and shaped, as far as possible, to conform to the experience of these teachers and to their suggestions for meeting through these schools the present practical needs of the North Carolina counties and communities in which they are located. The revised course of study in agriculture for the Farm-Life schools, contained in this bulletin, was the outcome of these conferences, and that course and the prescribed minimum of equipment herein, were heartily approved by the conference.

It is hoped that this bulletin will serve the purpose for which it has been prepared by rendering valuable assistance in properly equipping and in wisely arranging and directing the work of the Farm-Life schools of the State. It is exceedingly important that these schools should be properly equipped, provided with thoroughly qualified and experienced teachers, and have their

work shaped to meet the needs of country life and to prepare country boys and girls for making the most out of country life and country things. Upon the success of these schools depends the establishment of other schools of this sort in other counties of this State. Upon their success depends the success of this hopeful movement to adapt the work of the country school to the needs of the country people and to improve country life through the more efficient training of each generation of country children.

The list of those who have rendered valuable assistance in the preparation of this bulletin is too long to enumerate. I desire, however, to make general acknowledgment here of grateful appreciation to all of them.

Very truly yours,

J. Y. JOYNER,

*State Superintendent of Public Instruction.*

RALEIGH, N. C., September, 1915.



## INTRODUCTION

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The purpose of this bulletin is to insure a uniform course of study in Agriculture in the Farm-Life High Schools; to offer suggestions regarding equipment for the schools, and to give such references and details concerning the work as to relieve the teacher as much as possible.

The course is intended to be elastic enough to meet the needs of the schools in every section of the State. If the school is located in a county where, for example, truck farming is carried on extensively, the teacher should arrange to give more emphasis to this course than to some of the other courses which are not of so much importance in that section.

The work has been outlined to meet the needs of the boy or girl who is expecting to take an elementary course in Agriculture but does not intend to pursue the work farther than the high school. The course is arranged so that a student who is preparing for college may take the regular high school course and as much of the Agricultural work as possible. To prepare the farm boys to make better farmers and farmer citizens; to help the boy to see that in choosing Agriculture as a life's pursuit he is choosing as noble a profession as any other; to arouse the interest of the student in the workings of Nature in order that he may have a more comprehensive view of life and life processes; to improve the social conditions of the rural districts and to relieve the drudgery of the farm by the introduction of machinery—all of these things have been in mind in making out this work and it is hoped that these schools will be able to go far in solving these problems.

Several changes in the course as outlined last year are needed to accommodate the teacher. The insects which attack the various crops will be studied with the crop, instead of giving a course in Entomology; Manual Training will be given as a supplement to other courses instead of a separate course; and Mechanical Drawing has been omitted from the course at present.

The author of this bulletin wishes to express thanks to Prof. C. L. Newman for many valuable suggestions; and to Prof. H. R. Fulton, Professor of Botany in the A. & M. College; Prof. M. E. Sherwin, Professor of Soils in the A. & M. College; Mr. A. G. Oliver, Poultryman in the Extension Department, and Mr. A. J. Reed, Dairyman in the Experiment Station, for suggestions regarding the equipment and courses in their respective Departments.

## Cost of Complete Equipment for School

(The estimates given below are catalogue prices from which a discount may be obtained, especially on scientific apparatus and books. The cost of material for the construction of book cases, poultry houses, etc., is not included.)

### LIBRARY:

|  |         |          |
|--|---------|----------|
| Teacher's reference books .....                                      | \$ 4.35 |          |
| Agricultural papers .....  | 5.00    |          |
| (Cost of books for other courses listed separately below, \$113.74.) |         |          |
| Other equipment .....  | 3.75    |          |
| Total .....  |         | \$ 13.10 |

### BOTANY:

|                                 |         |       |
|---------------------------------|---------|-------|
| Books .....                     | \$ 5.00 |       |
| Equipment for 10 students ..... | 75.00   |       |
| Total .....                     |         | 80.00 |

### AGRICULTURE:

|                 |          |       |
|-----------------|----------|-------|
| Books .....     | \$ 14.69 |       |
| Equipment ..... | 6.60     |       |
| Total .....     |          | 21.29 |

### FIELD CROPS:

|                 |          |       |
|-----------------|----------|-------|
| Books .....     | \$ 12.35 |       |
| Equipment ..... | 8.00     |       |
| Total .....     |          | 20.35 |

### VEGETABLE GARDENING:

|                 |         |       |
|-----------------|---------|-------|
| Books .....     | \$ 7.75 |       |
| Equipment ..... | 42.70   |       |
| Total .....     |         | 50.45 |

### FRUIT CULTURE:

|                 |         |       |
|-----------------|---------|-------|
| Books .....     | \$ 8.50 |       |
| Equipment ..... | 51.50   |       |
| Total .....     |         | 60.00 |

### FARM ANIMALS:

|                 |          |       |
|-----------------|----------|-------|
| Books .....     | \$ 14.65 |       |
| Equipment ..... | 52.50    |       |
| Total .....     |          | 67.15 |



## FEEDING LIVE STOCK:

|                 |         |         |
|-----------------|---------|---------|
| Books .....     | \$ 4.50 |         |
| Equipment ..... |         |         |
| Total .....     |         | \$ 4.50 |

## DAIRYING:

|                 |         |        |
|-----------------|---------|--------|
| Books .....     | \$ 6.60 |        |
| Equipment ..... | 373.00  |        |
| Total .....     |         | 379.60 |

## POULTRY RAISING:

|                 |         |       |
|-----------------|---------|-------|
| Books .....     | \$ 9.35 |       |
| Equipment ..... | 60.00   |       |
| Total .....     |         | 69.35 |

## SOILS AND FERTILIZERS:

|                 |          |        |
|-----------------|----------|--------|
| Books .....     | \$ 18.50 |        |
| Equipment ..... | 104.60   |        |
| Total .....     |          | 123.10 |

## RURAL ECONOMICS, ETC.:

|                 |          |       |
|-----------------|----------|-------|
| Books .....     | \$ 11.85 |       |
| Equipment ..... |          |       |
| Total .....     |          | 11.85 |

## FARM EQUIPMENT:

|   |  |            |
|---|--|------------|
| Farm tools, barn, carpenter's tools and horses..... |  | 1,384.65   |
| Grand total .....                                   |  | \$2,285.39 |

## Revised Course of Study in Agriculture for the Farm Life Schools

### FIRST YEAR

| <i>Subject</i>    | <i>Periods Per Week</i> |                 |
|-------------------|-------------------------|-----------------|
|                   | <i>Class</i>            | <i>Practice</i> |
| English .....     | 5                       |                 |
| Physiology .....  | 3                       |                 |
| Arithmetic .....  | 5                       |                 |
| Agriculture ..... | 5                       | 3               |

### SECOND YEAR

|                          |   |   |
|--------------------------|---|---|
| English .....            | 5 |   |
| Physical Geography ..... | 3 |   |
| Arithmetic .....         | 5 |   |
| Agriculture .....        | 5 | 3 |

### THIRD YEAR

|                   |   |   |
|-------------------|---|---|
| English .....     | 5 |   |
| History .....     | 5 |   |
| Chemistry .....   | 3 |   |
| Agriculture ..... | 5 | 3 |

### FOURTH YEAR

|                   |   |   |
|-------------------|---|---|
| English .....     | 5 |   |
| History .....     | 5 |   |
| Physics .....     | 3 |   |
| Agriculture ..... | 5 | 3 |

# SUGGESTED TEXTS FOR AGRICULTURE AND SCIENCE COURSES

| Course                | Year | Term        | Text                                     | Author                  | Publisher                       | Price   |
|-----------------------|------|-------------|--|-------------------------|---------------------------------|---------|
| Physiology.....       | 1st  | 1st and 2nd | Animal and Man.....                      | Kellogg.....            | Holt.....                       | \$ 1.25 |
| Botany.....           | 1st  | 1st and 2nd | Beginner's Botany.....                   | Bailey.....             | Macmillan..                     | .60     |
|                       |      |             | Introduction to Botany.....              | Bergen & Caldwell.      | Ginn.....                       | 1.40    |
|                       |      |             | Essentials of Botany.....                | Fulton.....             | H. R. Fulton                    | .25     |
| Agriculture.....      | 1st  | 1st and 2nd | The Essentials of Agriculture..          | Waters.....             | Ginn.....                       | 1.25    |
|                       |      |             | Elements of Agriculture.....             | Warren.....             | Macmillan..                     | 1.10    |
| Physical Geography    | 2nd  | 1st and 2nd | New Physical Geography.....              | Tarr.....               | Macmillan..                     | 1.25    |
| Field Crops.....      | 2nd  | 1st and 2nd | Field Crops.....                         | Wilson & Warburton      | Webb.....                       | 1.50    |
| Vegetable Gardening   | 2nd  | 1st         | Vegetable Gardening.....                 | Green.....              | Webb.....                       | 1.00    |
| Fruit Culture.....    | 2nd  | 2nd         | Popular Fruit Growing.....               | Green.....              | Webb.....                       | 1.00    |
| Chemistry.....        | 3rd  | 1st and 2nd | Elementary Study of Chemistry            | McPherson and Henderson | Ginn.....                       | 1.25    |
|                       |      |             | Chemistry and Its Relation to Daily Life | Kahlenberg and Hart     | Macmillan..                     | 1.25    |
|                       |      |             | Chemistry of Common Things               | Brownlee and Others     | Allyn and Bacon                 | 1.25    |
| Farm Animals.....     | 3rd  | 1st         | Beginnings in Animal Husbandry           | Plumb.....              | Webb.....                       | 1.25    |
| Dairying.....         | 3rd  | 1st         | Dairy Cattle and Milk Production         | Eckles.....             | Macmillan..                     | 1.50    |
|                       |      |             | Testing Milk and Its Products            | Farrington and Woll     | Mendota Book Co., Madison, Wis. | 1.25    |
| Stock Feeding.....    | 3rd  | 2nd         | Profitable Stock Feeding.....            | Smith.....              | Webb.....                       | 1.50    |
| Poultry Raising.....  | 3rd  | 2nd         | Bulletins, References, etc.....          |                         |                                 |         |
| Physics.....          | 4th  | 1st and 2nd | A First Course in Physics.....           | Millikan and Gale       | Ginn.....                       | 1.25    |
|                       |      |             | First Principles of Physics.....         | Carhart and Chute       | Allyn & Bacon                   | 1.25    |
| Soils and Fertilizers | 4th  | 1st and 2nd | Soils and Soil Fertility.....            | Whitson and Walster     | Webb.....                       | 1.25    |
| Rural Economics...    | 4th  | 1st and 2nd | Bulletins, References, etc.....          |                         |                                 |         |



## The Library

A number of reference books is given in the outline of each course to be used by both the student and teacher.

Select the books for the school with reference to the needs of the community.

Catalogue and index all books and bulletins in order that the student may easily find what he wants and to insure them against loss.

Pamphlet holders will be found very useful for keeping bulletins.

For convenience in using, classify bulletins by subject instead of by number or by state.

Obtain lists of bulletins for free distribution from:

U. S. Department of Agriculture, Division of Publications, Washington, D. C.  
North Carolina Agricultural Experiment Station and A. & M. College, West Raleigh, N. C.

and other Southern Stations (see page 59 for addresses).

United States bureau of Education, Washington, D. C.

Get the monthly list of publications by request from the U. S. Department of Agriculture, Division of Publications.

Have the *Health Bulletin*, issued by the North Carolina State Board of Health, Raleigh, N. C., sent regularly to the school.

Some agricultural papers should be received regularly. Agricultural papers are usually of only temporary interest and will not need to be filed.

A list of publications from which to select is given below, and these may be obtained through G. E. Stechert & Co., at the prices quoted:

|                                   | <i>Per Year</i> |
|-----------------------------------|-----------------|
| The Progressive Farmer .....      | \$ .80          |
| The Southern Planter .....        | .50             |
| Southern Farming .....            | .85             |
| Wallace's Farmer .....            | .90             |
| Kimball's Dairy Farmer .....      | .80             |
| The Breeder's Gazette .....       | 1.00            |
| Hoard's Dairyman .....            | 1.00            |
| Poultry Item .....                | .90             |
| Farm Poultry .....                | .90             |
| Reliable Poultry Journal .....    | .35             |
| Southern Fruit Grower .....       | .70             |
| The Market Grower's Journal ..... | .75             |
| The Fruit Grower and Farmer ..... | .75             |
| Green's Fruit Grower .....        | .40             |

### Equipment:

Agricultural papers (not less than \$5.00).

Books (the books needed in the library are suggested under each

subject) .....\$118.09

|   |          |
|---|----------|
| Book cases (Fig. 1 gives details for constructing book case that may be made by the students) ..... | \$.....  |
| Pamphlet holders (see Fig. 2 for details of construction) .....                                     | .....    |
| Card index, (2 drawers, 3 x 5) .....  | 2.50     |
| Index cards, 1,000 .....  | 1.25     |
| Total.....  | \$126.84 |

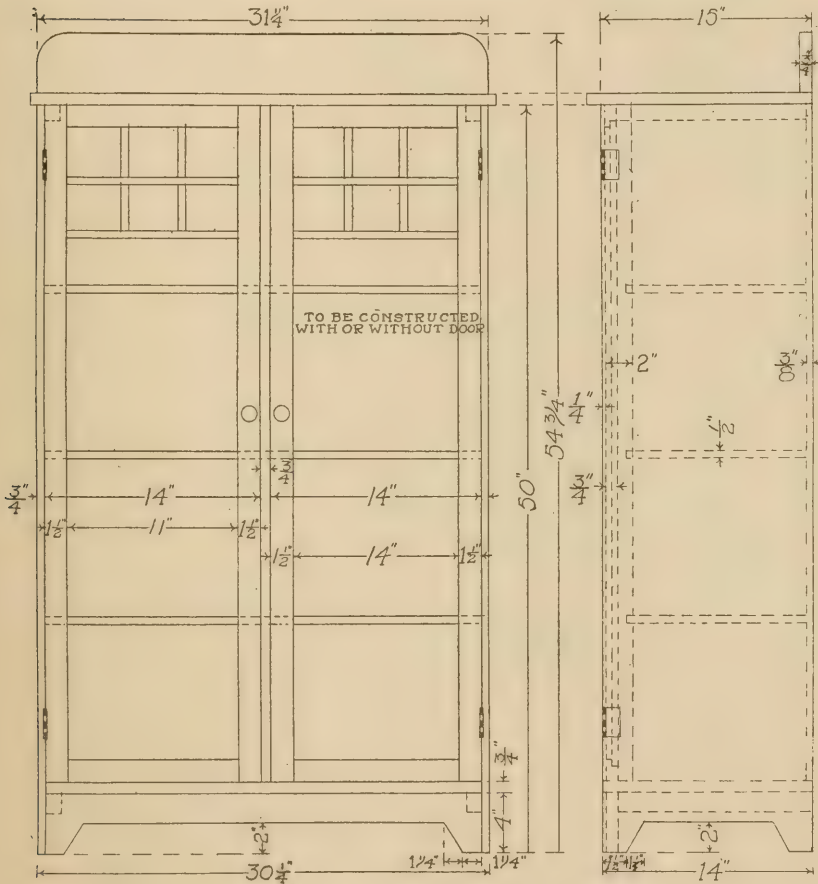


Fig. 1. Book Case.

## BILL OF MATERIAL FOR LIBRARY BOOKCASE.

- 1 top,  $\frac{3}{4}"$  x  $15"$  x  $31\frac{1}{2}"$ , hardwood
- 1 top back board,  $\frac{3}{4}"$  x  $4"$  x  $30\frac{1}{2}"$ , hardwood
- 2 sides,  $\frac{3}{4}"$  x  $14"$  x  $50"$ , hardwood
- 1 bottom,  $\frac{3}{4}"$  x  $14"$  x  $28\frac{3}{4}"$ , hardwood
- 1 bottom rail,  $\frac{3}{4}"$  x  $4"$  x  $28\frac{3}{4}"$ , hardwood
- 1 center piece,  $\frac{3}{4}"$  x  $2"$  x  $45\frac{3}{4}"$ , hardwood

- 4 door sides,  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x  $45\frac{1}{4}$ ", hardwood
- 4 door ends,  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x 14", hardwood
- 4 pieces door lattice,  $\frac{1}{2}$ " x  $\frac{1}{2}$ " x  $12\frac{1}{2}$ ", hardwood
- 4 pieces door lattice,  $\frac{1}{2}$ " x  $\frac{1}{2}$ " x 7", hardwood
- 2 bottom cleats,  $1\frac{1}{4}$ " x  $1\frac{1}{4}$ " x 13", soft wood
- 2 top cleats, 1" x 1" x  $12\frac{1}{2}$ ", soft wood
- 3 shelves,  $\frac{1}{2}$ " x 12" x  $28\frac{1}{2}$ ", soft wood
- 12 pieces backing,  $\frac{3}{8}$ " x 4" x  $29\frac{3}{4}$ ", soft wood
- 4 hinges
- 2 door handles

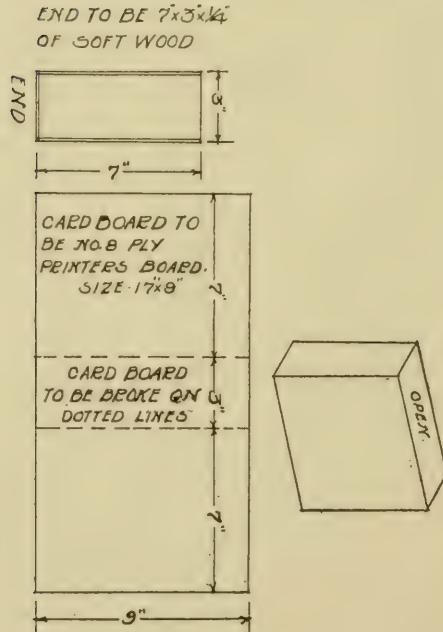


Fig. 2. Pamphlet Holder.



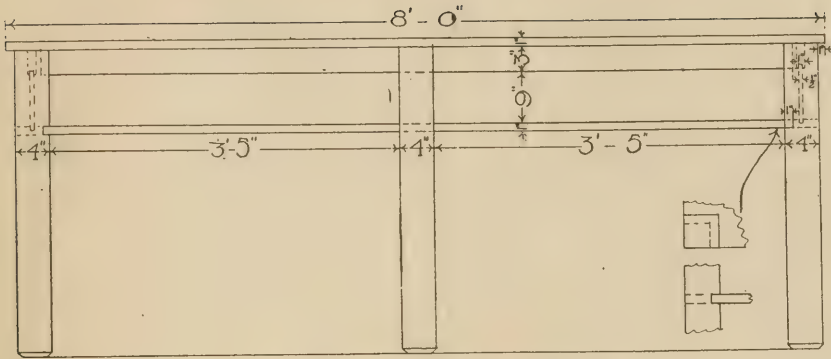


Fig. 3. Library Table (Side Elevation).

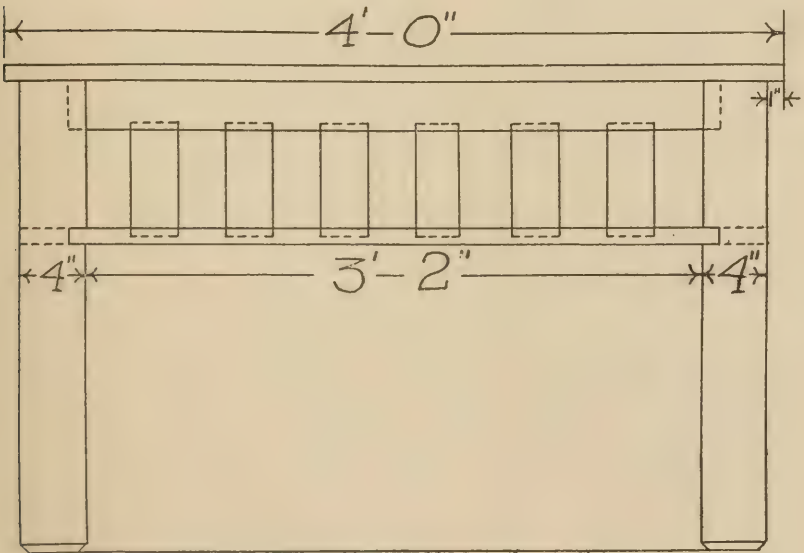


Fig. 4. Library Table (End Elevation).

## BILL OF MATERIAL FOR LIBRARY TABLE.

- 6 legs, 4" x 4" x 30"
- 2 rails, 13-16" x 3" x 8'-0"
- 2 rails, 13-16" x 3" x 4'-0"
- 4 boards, 13-16" x 12" x 8'-0", top
- 4 boards, 13-16" x 12" x 8'-0", shelf
- 1 piece, 1/2" x 3" x 8'-0" slats

## References for Agricultural Teachers

| <i>Title</i>   | <i>Author</i>      | <i>Publisher</i>           | <i>Price</i> |
|--|--------------------|----------------------------|--------------|
| The Teaching of Agriculture in the High School . . .   | Bricker . . . . .  | Macmillan . . . . .        | \$ .80       |
| Materials and Methods in High School Agriculture . . . | Hummel . . . . .   | Macmillan . . . . .        | 1.25         |
| Agricultural Education for Teachers . . . . .          | Bricker . . . . .  | American Book Co. . . . .  | .80          |
| Agriculture and Life . . . . .                         | Cromwell . . . . . | J. B. Lippincott . . . . . | 1.50         |

### FARMERS' BULLETINS:\*

- 606. Collection and Preservation of Insects and Other Material for Use in the Study of Agriculture.
- 586. Collection and Preservation of Plant Material for Use in the Study of Agriculture.

### U. S. DEPARTMENT BULLETINS:\*

- 7. Agricultural Training Course for Employed Teachers.
- 132. Correlating Agriculture With the Public School Subjects in the Southern States.
- 258. Lessons in Elementary Agriculture for Alabama Schools.

### U. S. BUREAU OF EDUCATION BULLETINS:

- 522. Agricultural Instruction in Secondary Schools.
- 601. Agricultural Teaching.

## Student Home Project Work

The State Extension Service furnishes a wide range of subjects for Home Project Work, such as Corn Clubs, Pig Clubs, Poultry Clubs, Tomato Clubs, and others. The teacher should do everything possible to promote interest among the students in this work. Each child should be kept busy always on some individual test, experiment, comparison, or study of its own. Information regarding the organization of any of the Clubs mentioned above or details for conducting any of the projects in any of the various boys' or girls' clubs will be furnished by the Office of Boys' Corn Clubs, West Raleigh, N. C.

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\*Farmers' Bulletins and U. S. Department Bulletins referred to are publications of the U. S. Department of Agriculture, Washington, D. C.

# The First Year Agriculture

## BOTANY

*Periods Per Week*

| <i>Class</i> | <i>Practice</i> |
|--------------|-----------------|
| 3            | 1               |

### TEXT:

| <i>Title</i>               | <i>Author</i>         | <i>Publisher</i>                          | <i>Price</i> |
|----------------------------|-----------------------|---|--------------|
| Beginner's Botany .....    | Bailey .....          | Macmillan .....                           | \$ .60       |
| Introduction to Botany ... | Bergen & Caldwell ... | Ginn .....                                | 1.40         |
| Essentials of Botany ..... | Fulton .....          | H. R. Fulton, West<br>Raleigh, N. C. .... | .25          |

### REFERENCES:

| <i>Title</i>             | <i>Author</i>   | <i>Publisher</i>      | <i>Price</i> |
|--------------------------|-----------------|-----------------------|--------------|
| Experiments with Plants. | Osterhout ..... | Macmillan .....       | \$1.25       |
| Practical Botany .....   | Andrews .....   | American Book Co. ... | 1.50         |

### FARMERS' BULLETINS:

- 134. Tree Planting on Rural School Grounds.
- 157. The Propagation of Plants.
- 428. Testing Farm Seeds at Home and in the Rural School.

### Equipment:

The list includes minimum quantities for a class of ten pupils. Practically all items should be increased for larger classes. Except for breakage the apparatus should last indefinitely. Exact prices cannot be given because of market fluctuations. It would be well to ask for quotations from several dealers. Addresses of dealers may be found on page 59.

- 1 compound microscope, double nosepiece, one ocular, two objectives.
- 72 microscope slides.
- 1 oz. coverglasses, medium thickness.
- 12 dissecting needles in wood handles.
- 4 forceps, best steel, medium fine points.
- 12 wide-mouth bottles, 500 cc., with corks.
- 1 lb. glass tubing, 6 and 8 mm. external diameter.
- 1 thermometer graduated to 150 degrees C.
- 6 beakers, 350 cc.
- 72 test tubes, 150 x 18 mm.
- 3 rubber stoppers, No. 5, with two holes.
- 3 rubber stoppers, No. 3, with one hole.
- 12 Erlenmeyer flasks, 250 cc.
- 3 ft. rubber tubing, ¼ inch diameter.
- 1 Harvard trip balance.
- 1 set weights, 10 to 1000 grams.



- 1 laboratory blast lamp for gasoline, with flame regulation.
- 3 Dialyzer cups, 100 x 16 mm.
- 1 wax pencil for writing on glass.
- 1 glass measuring graduate, 10 cc.
- 1 glass measuring graduate, 100 cc.
- 4 magnifiers, vulcanite mounting,  $\frac{3}{4}$  inch.
- 1 wire gauze with asbestos center, 150 mm.
- 2 Barnes dissecting microscopes with doublet.
- 1 alcohol burner, medium.
- 1 support stand with 3 rings, medium.
- 3 dropping bottles with pipette stoppers.
- 6 Syracuse watch glasses.
- 1 test tube clamp.
- 2 test tube brushes.

Estimated cost of above apparatus .....\$57.00

- 1 oz. iodine crystals.
- 1 oz. potassium iodine.
- 8 oz. sodium potassium tartrate.
- 1 oz. potassium chlorate.
- 1 lb. nitric acid, concentrated.
- 1 gal. alcohol, denatured.
- 8 oz. mercury.
- 4 oz. calcium nitrate, c.p.
- 4 oz. potassium chlorid, c.p.
- 4 oz. magnesium sulphate, c.p.
- 4 oz. diacid potassium phosphate, c.p.
- 1 oz. ferric chloride, c.p.
- 4 oz. calcium sulphate, c.p.
- 4 oz. monobasic sodium phosphate, c.p.
- 1 lb. copper sulphate, c.p.
- 1 lb. nitrate of soda, c.p.
- 1 lb. hydrochloric acid, concentrated.
- 8 oz. caustic potash.
- 3 pkgs. pith for sectioning.
- $\frac{1}{4}$  oz. diastase.
- 2 lbs. formaldehyde.

Estimated cost of chemicals .....\$ 7.00

Most of the above chemicals can be bought from a good drug store. The quantities are sufficient for several times the needs of ten pupils. Some items of chemicals and of apparatus may be on hand for work in chemistry or physics, and need not be duplicated for botany.

The following items can usually be bought to advantage from local dealers:

- 1 razor for sectioning, cheap grade.
- 1 stop for above.
- 1 scissors, small.
- 12 flower pots, 4 and 6 inch.

6 enamelware pans; about 10 inches.

24 fruit jars, 1 and 2 qt. sizes.

1 roll tire tape.

20 pcs. glass, 4 x 5 inches, old photo negatives.

Small quantities of sugar, starch, salt, Wesson oil, gasoline, ammonia, sealing wax, red ink, vaseline.

Estimated cost .....\$11.00

Total estimated cost .....\$75.00

Each pupil will provide himself with a loose notebook cover with plain ledger paper for drawings, a hard pencil and eraser.

### **Practice Work for the Course in Botany**

The references mentioned under this course will give as many practical exercises as can be used. The list of apparatus given above was made to conduct the practice exercises given in the Essentials of Botany by Fulton.

## AGRICULTURE

### *Periods Per Week*

|                                     | <i>Class</i>  | <i>Practice</i>  |              |
|-------------------------------------|---------------|------------------|--------------|
|                                     | 3             | 1                |              |
| <b>TEXT:</b>                        |               |                  |              |
| <i>Title</i>                        | <i>Author</i> | <i>Publisher</i> | <i>Price</i> |
| The Essentials of Agriculture ..... | Waters .....  | Ginn .....       | \$1.25       |
| Elements of Agriculture..           | Warren .....  | Macmillan .....  | 1.10         |

### REFERENCES:

| <i>Title</i>  | <i>Author</i>          | <i>Publisher</i>                               | <i>Price</i> |
|---|------------------------|--|--------------|
| Principles of Plant Culture .....                                 | Goff .....             | University Coöperative Co., Madison, Wis. .... | \$1.00       |
| Principles of Agriculture Through the School and Home Garden .... | Stebbins .....         | Macmillan .....                                | 1.00         |
| Practical Agriculture ....  | Wilkinson .....        | American Book Co..                             | 1.00         |
| Elementary Principles of Agriculture .....                        | Ferguson & Lewis ....  | Ferguson Pub. Co., Sherman, Tex.....           | 1.00         |
| Practical Lessons in Agriculture .....                            | Ivins & Merrill .....  | American Book Co..                             | .84          |
| General Science .....   | Caldwell & Eikenberry  | Ginn .....                                     | 1.00         |
| First Year Science .....  | Snyder .....           | Allyn & Bacon .....                            | 1.25         |
| Elementary Entomology...  | Sanderson & Jackson .. | Ginn .....                                     | 2.00         |
| Nature Study and Life...  | Hodge .....            | Ginn .....                                     | 1.50         |
| Fights of a Farmer.....   | Snyder .....           | J. B. Lippincott.....                          | 1.25         |
| Landscape Gardening ....  | Waugh .....            | Orange-Judd .....                              | .50          |

### Equipment:

Use farm tools and apparatus listed under Course in Botany.

|   | <i>Price</i> |
|---|--------------|
| Insect nets .....   | \$2.00       |
| 6 killing bottles (see page 6, Farmers' Bulletin, 606) .....  | .25          |
| Insect pins .....   | .25          |
| 1 lb. potassium, cyanide.....   |              |
| 6 insect mounting boards to be made by students (see Fig. 10, page 11, Farmers' Bulletin, 606). Boxes for preserving mounted insects (see page 12 of bulletin mentioned above).               |              |
| Several dozen pieces of glass 5 x 7 inches (use photographers' dry plate. The gelatin may be easily removed by soaking in warm water).  |              |
| 6 rolls gummed binding tape .....   | .60          |
| Cardboard .....   | 1.00         |
| 100 small card board pill boxes (obtained from druggist).....   | .50          |
| (See Fig. 5 illustrating use of pill boxes for mounting seed. The boxes are glued to a piece of cardboard, filled with seed, covered with a piece of glass and then bound with binding tape.) |              |



|  |        |
|--|--------|
| Small shell vials for collecting seed (see Farmers' Bulletin, 586) ..... | \$1.00 |
| Paper for mounting plants of interest (see Bulletin mentioned above) ... | 1.00   |
| Total .....  | \$6.60 |

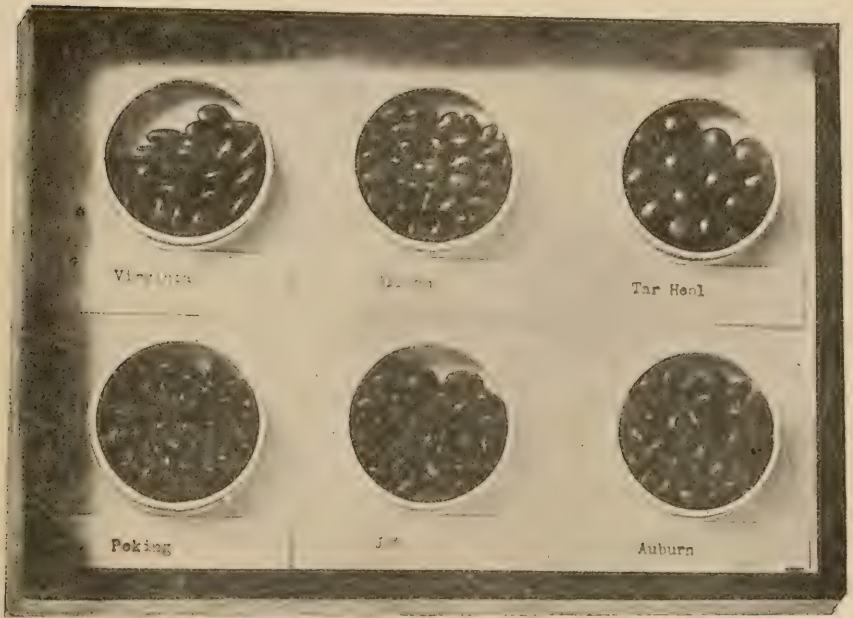


Fig. 5. Seeds Mounted in Small Pill Boxes for Comparing Varieties.

### Practice Work for the Course in Elementary Agriculture

A large number of exercises may be found in the references given that will be well adapted to this work.

Have the students in this course collect and mount a large number of insects, economic plants, wild grasses and legumes, specimens of diseased plants, seeds, etc.

Make mounts for the specimens collected. (See Farmers' Bulletins 586 and 606.)

# The Second Year Agriculture

## FIELD CROPS

*Periods Per Week*

|              |                 |
|--------------|-----------------|
| <i>Class</i> | <i>Practice</i> |
| 2            | 1               |

### TEXT:

| <i>Title</i>      | <i>Author</i>        | <i>Publisher</i> | <i>Price</i> |
|-------------------|----------------------|------------------|--------------|
| Field Crops ..... | Wilson & Warburton.. | Webb .....       | \$1.50       |

### REFERENCES:

| <i>Title</i>                             | <i>Author</i>    | <i>Publisher</i>  | <i>Price</i> |
|--|------------------|-------------------|--------------|
| Southern Field Crops ....                | Duggar .....     | Macmillan .....   | \$1.75       |
| Forage Plants and Their<br>Culture ..... | Piper .....      | Macmillan .....   | 1.75         |
| Cereals in America .....                 | Hunt .....       | Orange-Judd ..... | 1.75         |
| Corn Crops .....                         | Montgomery ..... | Macmillan .....   | 1.60         |
| Study of Corn .....                      | Shoesmith .....  | Orange-Judd ..... | .50          |
| Farm Grasses of the U. S.                | Spillman .....   | Orange-Judd ..... | 1.00         |
| Forage Crops .....                       | Voorhees .....   | Macmillan .....   | 1.50         |
| Alfalfa .....                            | Coburn .....     | Orange-Judd ..... | 1.00         |

### FARMERS' BULLETINS:

- 81. Corn Culture in the South.
- 101. Millet.
- 164. Rape.
- 174. Broom Corn.
- 229. Production of Good Seed Corn.
- 246. Saccharine Sorghums as Forage.
- 253. Germination of Seed Corn.
- 313. Harvesting and Storing Corn.
- 318. Cowpeas.
- 339. Alfalfa
- 343. Cultivation of Tobacco.
- 361. Meadow Fescue.
- 362. Conditions Affecting the Value of Market Hay.
- 372. Soy Beans.
- 382. Adulteration of Forage Plant Seed.
- 395. Sixty-day Oats.
- 400. A More Profitable Corn Planting Method.
- 414. Corn Cultivation.
- 415. Seed Corn.
- 420. Oats, Distribution.
- 424. Oats, Growing.
- 431. The Peanut.
- 436. Winter Oats for the South.
- 441. Lespedeza or Japan Clover.

---

\*The work outlined for the second year may be given in the third year if the teacher prefers.



## Practice Work for the Course in Field Crops

### 1. SEED SELECTION:

#### a. Corn:

1. Field Selection (with reference to plant, number of ears, etc.).
2. Harvesting.
3. Judging.
4. Testing seed.
5. Planting "Ear-to-Row" method.
6. In the second season compare yields from different ears.

#### b. Cotton:

1. Field selection. (Select the type of plant desired.)
2. Compare yields, length of lint, etc., of selected plants.
3. Plant selected seed.

### 2. SEED TESTING:

Make seed testing trays and test the seed of various farm crops.

### 3. SEED STUDY:

Identify and compare seed of different varieties of farm crops.

4. Collect and mount insects and specimens of plant diseases affecting farm crops.

### 5. STUDY SMALL GRAINS:

Compare structure of head, habit of growth, etc.

6. Identify the most common grasses and legumes, both wild and cultivated and make mounts of as many as possible.
7. Study various methods of destroying insects in stored grain.

### Equipment:

*Price*

Score cards for farm crops.....\$5.00  
Seed of several varieties of each of the field crops grown in the community.

Containers for seed. (Use glass jars or tin cans. Cans may be bought from the American Can Company, Atlanta, Ga., at very reasonable prices.)

Tools needed will be found in the list of Farm Equipment.

100 stakes for labeling plots ( $\frac{3}{4}$  x 3 in. and  $2\frac{1}{4}$  ft. long, painted white). ..... .50

1 rubber stamp labeling outfit ( $1\frac{1}{2}$  in. letters) for marking stakes... 2.50

---

Total.....\$8.00



## VEGETABLE GARDENING

### *Periods Per Week*

| <i>Class</i> | <i>Practice</i> |                |
|--------------|-----------------|----------------|
| 3            | 1               | (for one term) |

#### TEXT:

| <i>Title</i>                               | <i>Author</i> | <i>Publisher</i> | <i>Price</i> |
|--|---------------|------------------|--------------|
| Vegetable Gardening .....                  | Green .....   | Webb .....       | \$1.00       |
| Laboratory Manual of<br>Horticulture ..... | Hood .....    | Ginn .....       | ....         |

#### REFERENCES:

| <i>Title</i>                          | <i>Author</i> | <i>Publisher</i>       | <i>Price</i> |
|---------------------------------------|---------------|------------------------|--------------|
| Vegetable Gardening ....              | Watts .....   | Orange-Judd .....      | \$1.75       |
| Garden Farming .....                  | Corbett ..... | Ginn .....             | 2.00         |
| Garden Making .....                   | Bailey .....  | Macmillan .....        | 1.50         |
| Productive Vegetable<br>Growing ..... | Lloyd .....   | J. B. Lippincott ..... | 1.50         |

#### FARMERS' BULLETINS:

- 35. Potato Culture.
- 61. Asparagus Culture.
- 198. Strawberries.
- 204. Cultivation of Mushrooms.
- 220. Tomatoes.
- 232. Okra.
- 254. Cucumbers.
- 255. The Home Vegetable Garden.
- 282. Celery.
- 289. Beans.
- 324. Sweet Potatoes.
- 354. Onion Culture.
- 407. The Potato as a Truck Crop.
- 433. Cabbage.
- 434. The Home Production of Onion Seed and Sets.
- 460. Frames as a Factor in Truck Growing.
- 548. Storing and Marketing Sweet Potatoes.

#### Equipment:

*Price*

|   |         |
|---|---------|
| Sash for cold frames and hot beds .....                               | \$ 4.00 |
| Seed of common vegetables .....                                       | ....    |
| Containers for seeds (see same under Equipment for Field Crops) ..... | ....    |
| 1 Planet Jr. combination wheel hoe and seeder .....                   | 13.00   |
| 6 dibbles .....   | 2.40    |
| Hoes and rakes (farm equipment) .....                                 | ....    |
| Insecticides and fungicides .....                                     | 10.00   |
| 1 bucket spray pump .....   | 5.00    |
| 4 soil thermometers .....   | 4.00    |

|  |         |
|--|---------|
| 6 garden trowels .....   | \$ 1.50 |
| 1 reel and line .....  | 1.50    |
| 100 wooden labels .....  | .25     |
| Samples of fertilizer .....  | .....   |
| Flats .....  | .....   |
| Manila paper for paper pots; cut $4\frac{1}{2} \times 11\frac{1}{2}$ in..... | 1.00    |
| 1 box small short tacks, to use in making paper pots.....                    | .05     |
| Total.....   | \$42.70 |

### Practice Work for Course in Vegetable Gardening

#### 1. SEED STUDY:

- a. Identification. (See Fig. 9, Farmers' Bulletin, 586.)
- b. Germination. (Make germination trays.)
- c. Viability.

#### 2. PLANTING SEED:

- a. Different depths. Make a box with a glass side. Plant seed against the glass at varying depths to study effects of depth of planting.
- b. Note different lifting power of seed.
- c. Fertilizers.
- d. Kinds of soils.

#### 3. CONSTRUCTION OF TRANSPLANTING POTS, ETC.

- a. Construct hot beds and cold frames. (See text.)
- b. Paper pots. (Take a block  $2\frac{1}{2}$  in. square and 3 in. high; fasten the head of a bolt or large nail in the center of the top and then fasten the block to a table. To make the pots pass a piece of paper around the block, fold over the top from all sides; then drive a small short tack through the center of the folds. The tack is bradded against the bolt head and will hold the pot together securely enough to be handled.)
- c. Flats. Make out of light lumber, about 16 x 18 in. and 2 in. deep.

#### 4. TRANSPLANTING:

- a. Trimming plants.
- b. Watering.

#### 5. STARTING SWEET POTATOES.

#### 6. IRISH POTATOES:

- a. Cutting tubers.
- b. Formalin treatment for scab.

#### 7. CARE OF CROP:

- a. Cultivation, depth, etc.
- b. Watering.
- c. Weeding.
- d. Thinning.

## 8. INTERCROPPING:

- a. Companion crops.
- b. Succession crops.
- c. Examples.

## 9 AND 10. SPRAYING:

- a. Study spraying apparatus.
- b. Preparation of insecticides and fungicides.
- c. The uses and time of application of each kind.

## FRUIT CULTURE

*Periods Per Week*

|              |                 |                |
|--------------|-----------------|----------------|
| <i>Class</i> | <i>Practice</i> |                |
| 3            | 1               | (for one term) |

### TEXT:

| <i>Title</i>             | <i>Author</i> | <i>Publisher</i> | <i>Price</i> |
|--------------------------|---------------|------------------|--------------|
| Popular Fruit Growing... | Green .....   | Webb .....       | \$1.00       |

### REFERENCES:

| <i>Title</i>                           | <i>Author</i> | <i>Publisher</i>       | <i>Price</i> |
|--|---------------|------------------------|--------------|
| Principles of Fruit Grow-<br>ing ..... | Bailey .....  | Macmillan .....        | \$1.50       |
| The Pruning Book .....                 | Bailey .....  | Macmillan .....        | 1.50         |
| The American Apple<br>Orchard .....    | Waugh .....   | Orange-Judd .....      | 1.00         |
| The American Peach<br>Orchard .....    | Waugh .....   | Orange-Judd .....      | 1.00         |
| Productive Orchardng ...               | Sears .....   | J. B. Lippincott ..... | 1.50         |
| Harvesting Fruits .....                | Waugh .....   | Orange-Judd .....      | 1.00         |

### FARMERS' BULLETINS:

- 113. The Apple and How to Grow it.
- 154. The Home Fruit Garden.
- 181. Pruning.
- 213. Raspberries.
- 291. Evaporation of Apples.
- 482. The Pear and How to Grow it.
- 491. Profitable Management of the Small Apple Orchard.
- 631, 632, and 633. Growing Peaches.

### Equipment:

|   | <i>Price</i> |
|---|--------------|
| 6 hand pruning shears .....   | \$ 6.00      |
| 2 Henry Disston pruning saws, No. 25.....   | 2.50         |
| 1 pole pruner ("Happy Thought"), Kansas Pruning Knife Company<br>Detroit, Mich. ....  | 1.50         |
| 2 tree trimmers, Tiffany Tree Trimmer Co., Franklin Forks, Pa. . .  | 2.50         |
| 1 barrel spray pump complete with 8 ft. bamboo rod and angle<br>disc nozzle. (The "Iron Age" spray pump is recommended.<br>This pump is fastened on the outside of the barrel, which<br>makes it easier cared for)..... | 25.00        |
| Insecticides and fungicides .....   | 10.00        |
| 1 grafting chisel .....   | .75          |
| 1 mallet .....  | ...          |
| 1 budding knife .....   | .50          |
| 1 hawk bill pruning knife .....   | .75          |
| Raffia for tying buds and plants .....  | 1.00         |
| Materials for grafting wax: Beeswax, resin, tallow.....   | 1.00         |
| Plants of various fruit trees .....   | ...          |

|             |         |
|-------------|---------|
| Total ..... | \$51.50 |
|-------------|---------|



## Practice Work for Course in Fruit Culture

### 1. PLANTING TREES:

- a. Trimming trees.
- b. Planting in soil. (Use apple and peach trees 1 and 2 years old.)

### 2. PRUNING:

- a. Identify leaf and flower buds.
- b. Study sap circulation.
- c. Study methods of cutting to avoid stubs.  
(Prune trees 3, 4, and 8 years of age.)

### 3. PROPAGATION:

- a. Whip grafting.
- b. Piece root grafts.
- c. Cleft grafting (apples).  
(Make grafting wax, use 7 parts beeswax, 5 parts resin, 2 parts of tallow. See text for preparation.)
- d. Budding. (Cherries, peaches, pecans.)
- e. Bridge grafting.
- f. Layering.
  - 1. Simple, and compound (grape).
  - 2. Mound (gooseberries).

### 4. STRATIFYING SEED.

### 5. STUDY SPRAYING APPARATUS.

### 6. PREPARATION OF SPRAYS.

### 7. APPLICATION OF SPRAYS.

(Spray calendars may be found in the text. A good spray calendar suitable for framing is sent out with the Deming Company's catalogue.)

### 8. Learn to identify varieties of fruit grown in the community.

### 9. Note effects of poor cultivation, pruning, insects and diseases affecting fruits grown in community.

# The Third Year Agriculture

## FARM ANIMALS

*Periods Per Week*

| <i>Class</i> | <i>Practice</i> |                |
|--------------|-----------------|----------------|
| 2            | 1               | (for one term) |

### TEXT:

| <i>Title</i>                         | <i>Author</i> | <i>Publisher</i> | <i>Price</i> |
|--------------------------------------|---------------|------------------|--------------|
| Beginnings in Animal Husbandry ..... | Plumb.....    | Webb .....       | \$1.25       |

### REFERENCES:

| <i>Title</i>                           | <i>Author</i>        | <i>Publisher</i>                | <i>Price</i> |
|--|----------------------|---------------------------------|--------------|
| Live Stock Judging and Selection ..... | Curtis .....         | Lea & Feber, Philadelphia ..... | \$2.00       |
| Types and Breeds of Farm Animals ..... | Plumb .....          | Ginn .....                      | 2.00         |
| Farm Animals .....                     | Hunt & Burkett ..... | Orange-Judd .....               | 1.50         |
| Domesticated Animals and Plants .....  | Davenport .....      | Ginn .....                      | 1.25         |
| Animal Husbandry for Schools .....     | Harper .....         | Macmillan .....                 | 1.50         |
| Judging Live Stock .....               | Craig .....          | Sanders Pub Co., Chicago .....  | 1.65         |
| Swine in America .....                 |                      | Orange-Judd .....               | ....         |
| Productive Swine Husbandry .....       | Day .....            | J. B. Lippincott .....          | 1.50         |
| Manual of Farm Animals.                | Harper .....         | Macmillan .....                 | 2.00         |

### FARMERS' BULLETINS:

- 205. Pig Management.
- 573. The Angora Goat.
- 576. Breeds of Sheep for the Farm.
- 580. Beef Production in the South.

### DEPARTMENT BULLETINS:

- 20. The Management of Sheep on the Farm.
- 73. Raising and Fattening Beef Calves in Alabama.
- 152. Scabies of Cattle.
- 206. Milk Fever and Its Treatment.
- 258. Texas or Tick Fever and Its Eradication.
- 351. The Tuberclin Test of Cattle for Tuberculosis.
- 379. Hog Cholera.
- 439. Anthrax.
- 449. Rabies.
- 473. Tuberculosis.

498. Methods of Exterminating Tick Fever.  
 530. Important Poultry Diseases.  
 569. Texas or Tick Fever.

**Equipment:***Price*

|   |         |
|---|---------|
| Animals for school (hogs and other animals, except horses, cows<br>and fowls, which are listed elsewhere) ..... | \$50.00 |
| Score cards for stock judging .....   | 2.50    |
| Total.....  | \$52.50 |

**Practice Work for Course in Farm Animals**

1. Construct several types of hog houses.
2. Score as many animals of all kinds as possible.
3. Study various breeds of farm animals.

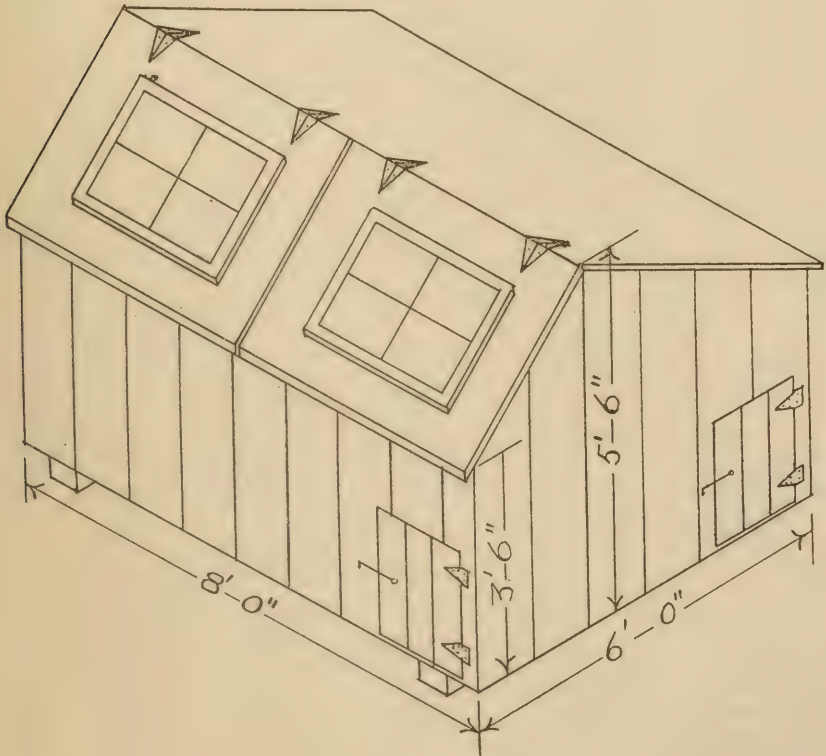


Fig. 6. Hog House.  
 (Courtesy of Pennsylvania State College.)

## BILL OF MATERIAL FOR HOG HOUSE

- 20 pieces,  $\frac{7}{8}$ " x 10" x 3'-6", back and front siding.
- 16 pieces,  $\frac{7}{8}$ " x 10" x 5'-6", ends.
- 20 pieces,  $\frac{7}{8}$ " x 10" x 8'-0", roof.
- 4 pieces, 2" x 4" x 4'-0", corner posts.
- 2 pieces, 2" x 4" x 8'-0", sills.
- 2 pieces, 2" x 4" x 6'-0", sills.
- 2 pieces, 2" x 4" x 8'-0", plate.
- 2 pieces, 2" x 4" x 8'-0", end plates.
- 1 piece, 2" x 4" x 8'-0", ridge pole.
- 2 pieces, 2" x 4" x 8'-0", frame around doors and windows.
- 2 pieces, 6" x 8" x 6'-0", skid poles.
- 2 sash and 2 batten doors, hinges, hooks, staples and nails.

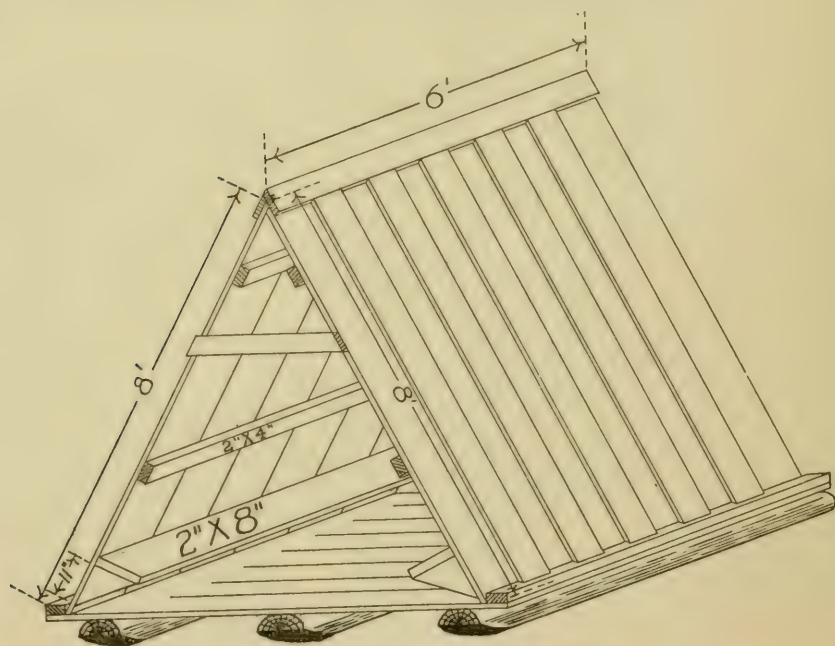


Fig. 7. Portable A-Shaped Hog House.  
(Farmers' Bulletin, 566.)

## BILL OF MATERIAL FOR A-SHAPED HOG HOUSE

- 13 pieces, 1" x 12" x 16'-0", for sides, back, and floor of house.
- 9 pieces, 16'-0", batten.
- 3 pieces, 2" x 4" x 12'-0", for frame work.
- 2 pieces, 2" x 8" x 12'-0", for pig rail or guard.
- 121 pieces 1" x 6" x 16'-0", for saddles board.
- 3 poles for skids.
- Nails.



## FEEDING LIVE STOCK

*Periods Per Week*

*Class*

3 (for one term)

### TEXT:

| <i>Title</i>             | <i>Author</i> | <i>Publisher</i> | <i>Price</i> |
|--------------------------|---------------|------------------|--------------|
| Profitable Stock Feeding | Smith         | Webb             | \$1.50       |

### REFERENCES:

| <i>Title</i>                          | <i>Author</i> | <i>Publisher</i> | <i>Price</i> |
|---------------------------------------|---------------|------------------|--------------|
| Principles of Feeding                 | Burkett       | Orange-Judd      | \$1.50       |
| Productive Feeding of<br>Farm Animals | Woll          | J. B. Lippincott | 1.50         |

### FARMERS' BULLETINS:

- 22. The Feeding of Farm Animals.
- 170. Principles of Horse Feeding.
- 346. The Computation of Rations.
- 411. Feeding Hogs in the South.
- 578. The Handling and Feeding of Silage.
- 588. Economic Cattle Feeding in the Corn Belt.

## DAIRYING

### *Periods Per Week*

| <i>Class</i> | <i>Practice</i> |                |
|--------------|-----------------|----------------|
| 3            | 1               | (for one term) |

#### TEXT:

| <i>Title</i>                              | <i>Author</i>          | <i>Publisher</i>                        | <i>Price</i> |
|---|------------------------|---|--------------|
| Dairy Cattle and Milk<br>Production ..... | Eckles .....           | Macmillan .....                         | \$1.60       |
| Testing Milk and Its<br>Products .....    | Farrington & Woll .... | Mendota Book Co.,<br>Madison, Wis. .... | 1.25         |

#### REFERENCES:

| <i>Title</i>               | <i>Author</i> | <i>Publisher</i>  | <i>Price</i> |
|----------------------------|---------------|-------------------|--------------|
| The Business of Dairying.  | Lane .....    | Orange-Judd ..... | \$1.50       |
| Milk and Its Products .... | Wing .....    | Macmillan .....   | 1.50         |
| Clean Milk .....           | Belcher ..... | Orange-Judd ..... | 1.00         |

#### FARMERS' BULLETINS:

- 55. The Dairy Herd.
- 106. Breeds of Dairy Cattle.
- 166. Cheese Making on the Farm.
- 280. A Profitable Tenant Dairy Farm.
- 349. The Dairy Industry in the South.
- 363. The Use of Milk as Food.
- 413. The Care of Milk and its use in the Home.
- 487. Cheese.
- 490. Bacteria in Milk.
- 541. Farm Butter Making.

#### DEPARTMENT BULLETINS:

- 1. Medical Milk Commissions and Certified Milk.
- 49. The Cost of Raising a Dairy Cow.

#### Equipment:

|   | <i>Price</i> |
|---|--------------|
| 4 cows .....                              | \$300.00     |
| 1 cream separator (135 lb.) .....         | 32.50        |
| 1 Babcock tester (6 bottles) .....        | 9.00         |
| 1 doz. milk test bottles, 10% .....       | 1.25         |
| ½ doz cream test bottles, 50% .....       | 1.50         |
| Pipettes: 1 9cc., 1 17.6cc., 1 18cc. .... | .60          |
| 1 acid measure .....                      | .15          |
| 1 milk scales .....                       | 3.00         |
| 1 thermometer .....                       | .75          |
| 1 lactometer .....                        | .25          |
| 1 churn .....                             | 4.00         |
| 1 butter printer .....                    | .90          |

|  |          |
|--|----------|
| Assorted wash brushes .....              | \$ 1.50  |
| Sulphuric acid, 1 gallon .....           | .60      |
| Butter ladles and packers, assorted..... | 1.00     |
| Cream scales .....                       | 10.00    |
| Milking pails .....                      | 1.00     |
| Milk cans, etc.....                      | 5.00     |
| <hr/>                                    |          |
| Total.....                               | \$373.00 |

### Practice Work for Course in Dairying

1. Testing milk and cream by the Babcock method.
2. Make acidity test of milk, cream, and buttermilk, using Mann's test, Marshall's, and others.
3. THE LACTOMETER TEST:
  - a. Estimation of watering.
  - b. Estimation of skimming.
4. SKIMMING MILK BY—
  - a. Centrifugal separator.
  - b. Gravity method.
5. RIPENING CREAM:
  - a. Ripening temperature.
  - b. Preparation of starter.
  - c. Inoculating cream.
6. CHURNING (Using hand churn):
  - a. Acid tests.
  - b. Babcock tests.
  - c. Estimating color and salt, for butter.
  - d. Packing and preparing butter for market.
7. JUDGING BUTTER:
  - a. Score samples of butter, using score cards.
8. MAKING COTTAGE CHEESE (Using skim milk):
  - a. Setting.
  - b. Draining.
  - c. Salting.
  - d. Packing.
9. CHEESE MAKING.

## POULTRY RAISING

*Periods Per Week*

| <i>Class</i> | <i>Practice</i> |                |
|--------------|-----------------|----------------|
| 3            | 1               | (for one term) |

### TEXT:

Bulletins from the U. S. Department of Agriculture.

### REFERENCES:

| <i>Title</i>                                      | <i>Author</i>   | <i>Publisher</i>       | <i>Price</i> |
|---|-----------------|------------------------|--------------|
| Farm Poultry .....                                | Watson .....    | Macmillan .....        | \$1.50       |
| How to Keep Hens for Profit .....                 | Valentine ..... | Macmillan .....        | 1.50         |
| Principles and Practices of Poultry Culture ..... | Robinson .....  | Ginn .....             | 2.50         |
| Domestic Birds .....                              | Robinson .....  | Ginn .....             | 1.35         |
| Productive Poultry Husbandry .....                | Lewis .....     | J. B. Lippincott ..... | 1.50         |
| Poultry Keeping .....                             | Lewis .....     | J. B. Lippincott ..... | 1.00         |

### FARMERS' BULLETINS:

- 51. Standard Varieties of Chickens.
- 64. Ducks and Geese.
- 128. Eggs and Their Use as Food.
- 182. Poultry as Food.
- 200. Turkeys.
- 234. The Guinea Fowl.
- 236. Incubation and Incubators.
- 287. Poultry Management.
- 355. A Successful Poultry and Dairy Farm.
- 445. Marketing Eggs Through the Creamery.
- 452. Capons and Caponizing.
- 528. Hints to Poultry Raisers.
- 530. Important Poultry Diseases.
- 574. Poultry House Construction.
- 585. Natural and Artificial Incubation of Hens' Eggs.
- 594. Shipping Eggs by Parcel Post.

### DEPARTMENT BULLETINS:

- 17. The Refrigeration of Dressed Poultry in Transit.
- 21. The Commercial Fattening of Poultry.

### Equipment:

|   | <i>Price</i> |
|---|--------------|
| 20 hens and 2 males (males not related) ..... | \$60.00      |

The price given is for standard bred fowls. The difference in the cost of ordinary stock and good stock can soon be made by the sale of eggs at fancy prices for hatching.



The breeds recommended are general purpose breeds and are given in order of preference for this State.

Barred Plymouth Rock.

White Wyandotte.

White or Buff Plymouth Rock.

Rhode Island Red (single or rose comb).

Orpington (buff or white).

1 colony house (see Fig. 10) with or without floor (to be made by students).

2 feed hoppers (see Fig. 12), (to be made by students).

2 drinking fountains (to be made by students).

Punch a hole with a large nail about  $1\frac{1}{2}$  in. from the top of an old paint can. Provide a pan about two inches deep to hold the inverted can, which when filled with water furnishes a constant supply of water. Drinking fountains for small chickens may be made in the same way, but use a tomato can and a smaller pan for a container.

Coops for each brood of chickens hatched (see Figs. 8 and 9), (to be made by students).

### Practice Work for Course in Poultry Raising

#### 1. SETTING THE HEN:

- a. The hen should be placed in a quiet and isolated place, so that no other hen can lay in her nest.
- b. Sitting boxes should be about 7 inches high, with the straw arranged in a saucer shape to enable the hen to step into the nest without danger of breaking the eggs.
- c. Hens should be moved to sitting quarters after dark and allowed to remain on china eggs or some eggs not intended for hatching for at least 24 hours. Then after they have thoroughly quieted down place them on the sitting eggs.
- d. The hen should be carefully dusted during the period of incubation: First, immediately after setting her, and second, three days before hatching. This precaution is absolutely necessary to prevent lice from getting on the young chicks.

#### 2. MAKE INSECT POWDER.

(Caution the students regarding the handling of gasoline near fire and against the danger of handling carbolic acid.)

Three parts gasoline, 1 part carbolic acid; mix, then add as much plaster of paris as is required to make a very stiff dough. Spread in layers about  $\frac{1}{2}$  inch thick to dry. After the mixture has been dried thoroughly mash into a powder and bottle for use.

#### 3. CARE OF YOUNG CHICKS:

- a. Construction of coops. (See Figs. 8 and 9.)
- b. Cover floor of coop with  $\frac{1}{2}$  inch of clean sand.
- c. Whitewash the coop with a mixture of 3 quarts of whitewash to 1 tablespoon full of "Creolin." (This gives a sanitary odor and is very effective in keeping lice away.)

- d. Place the hen and chicks in the coop and allow the chicks to pick around before giving them any food. (A chick *should not be fed for 48 hours after hatching*, since the yolk of the egg, which is in the young chick's stomach when hatched, must be assimilated before the chick can handle any other food; feeding immediately after hatching is likely to give the chick indigestion.) Keep the hen confined for the first week, but allow the chicks to run out.
- e. Food for the first week:
  - Keep finely broken oyster shells available.
  - Hard boiled eggs and rolled oat meal mashed together dry.
  - Thoroughly* cooked "Johnny cake," and *never* any wet dough.
  - Water or fresh skim milk should be kept before them all of the time.
  - Feed often (about every four hours) just enough for them to clean up. Keep the chicks anxious to pick up what is given them.
- f. Food for the second week:
  - Cracked wheat, screenings, or mixed chick feed.
  - Mash, composed of *wheat* bran 2 parts by weight, ground corn and oats 1 part, wheat middlings 1 part.
  - Feed in dry hoppers.
- g. Clean coops once a week.

#### 4. COLONY HOUSES:

- a. If floored, cover with sand. If not floored, cover the dirt with 6 inches of pine needles or straw.
- b. Whitewash, using the same mixture mentioned above.
- c. Clean dropping board once a week. (Put the droppings in barrels and cover with a few handfuls of land plaster, to retain the ammonia; keep in a dry place. (Hen manure makes a very valuable fertilizer.)
- d. The perches (which should be removable) must be covered with kerosene or scalded every two weeks.

#### 5. THE DUST BATH:

- Make boxes 14 x 18 inches and 10 inches deep. Put in about 6 inches of clean dust mixed with a teacupful of sulphur.

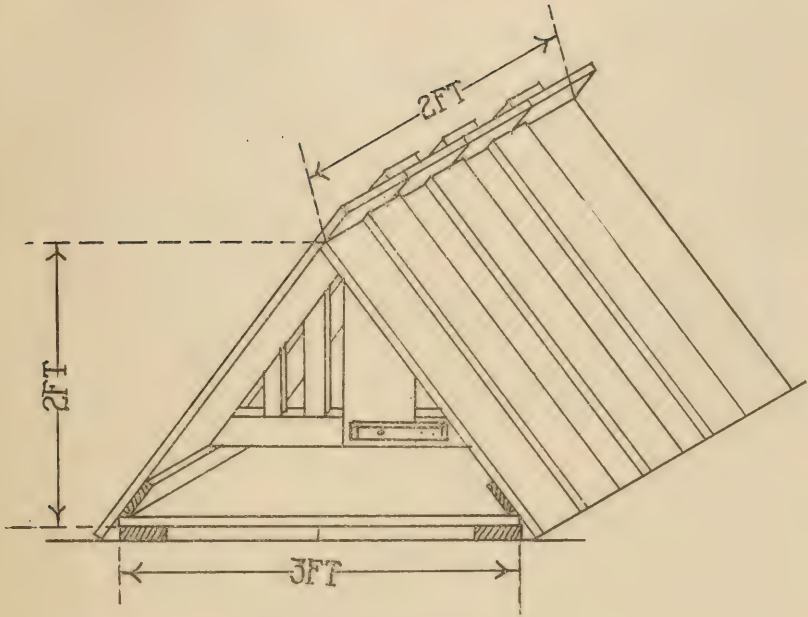


Fig. 8. A-Shaped Chicken Coop.  
 (Courtesy Mr. A. G. Oliver of the North Carolina Experiment Station.)

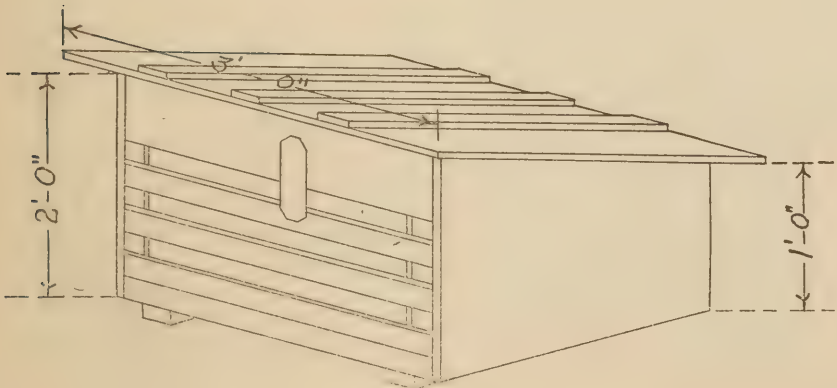


Fig. 9. Box Chicken Coop.  
 (Courtesy Mr. A. G. Oliver of the North Carolina Experiment Station.)

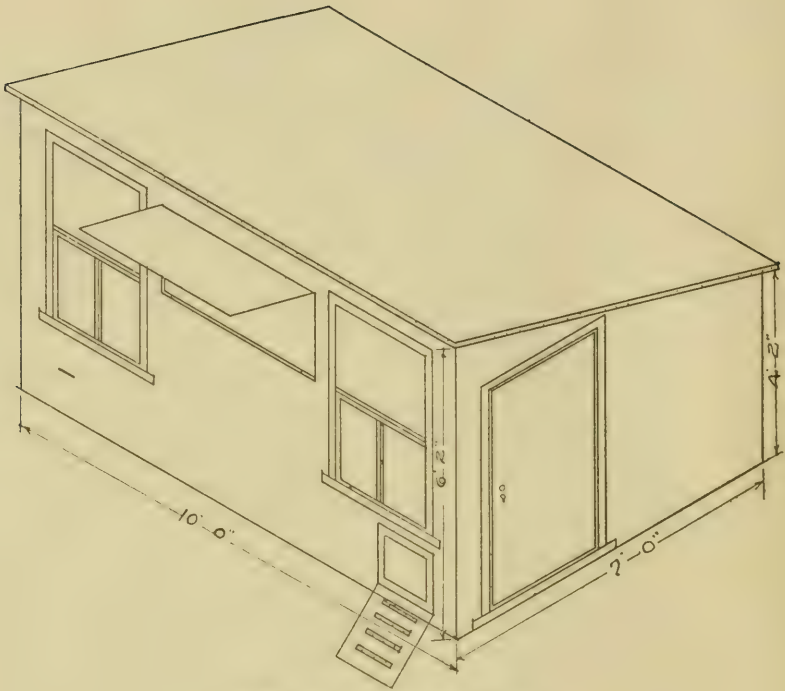


Fig. 10. Poultry Colony House.  
(Adapted from Farmers' Bulletin, 574.)

#### BILL OF MATERIAL FOR POULTRY COLONY HOUSE.

- 2 pieces, 6" x 8" x 10'-0" long, for skids.
- 6 pieces, 2" x 6" x 7'-0" long, for floor joists.
- 16 pieces,  $\frac{7}{8}$ " x 10" x 7'-0" long, for end siding.
- 12 pieces,  $\frac{7}{8}$ " x 10" x 5'-0" long, for rear siding.
- 12 pieces,  $\frac{7}{8}$ " x 10" x 6'-6" long, for front siding.
- 2 pieces, 2" x 4" x 10'-0" long, for front and back plates.
- 2 pieces, 2" x 4" x 8'-0" long, for end plates.
- 6 pieces, 2" x 4" x 8'-0" long, for ceiling joists.
- 10 pieces,  $\frac{7}{8}$ " x 10" x 11'-0" long, for sheathing.
- 10 pieces,  $\frac{7}{8}$ " x 10" x 10'-0" long, for flooring.
- 5 pieces,  $\frac{7}{8}$ " x 10" x 10'-0" long, for flooring under roosts.
- 10 pieces, 2" x 4" x 6'-0" long, for corner posts and studs.
- Doors, windows, nails, hinges, and hooks.

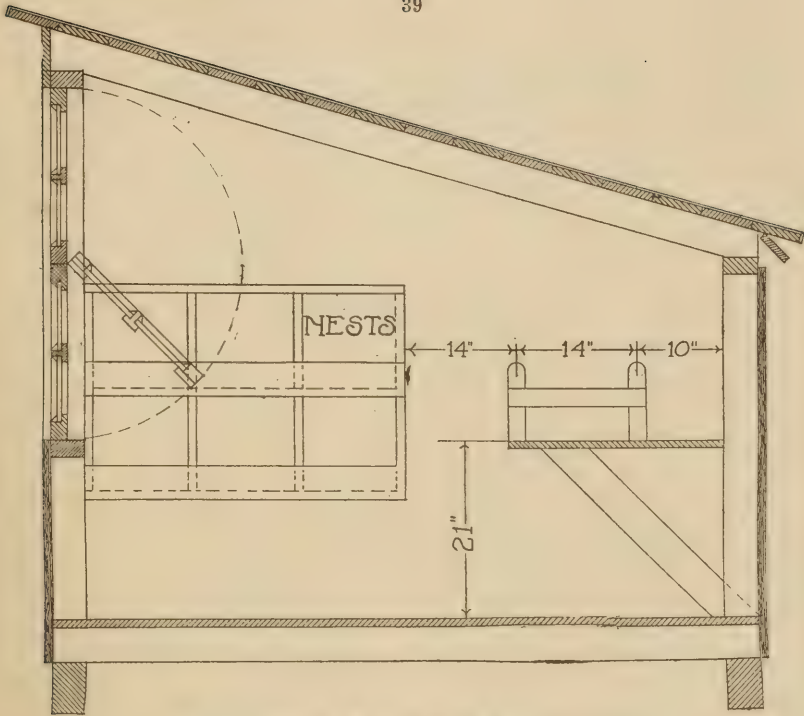
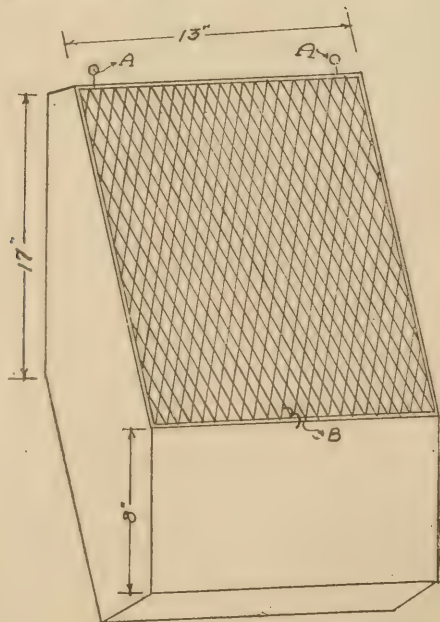


Fig. 11. Section of Colony House Shown in Fig. 10.



The wire covering the feed should be stiff woven wire, with about 1-inch mesh. The hooks at AA should extend through the top, so that the wire hangs on the feed and drops down as the feed is eaten. The hook shown at B is provided to allow the wire to be fastened up putting the food out of reach of the fowls.

Fig. 12. Dry Feed Hopper.



# The Fourth Year Agriculture

## SOILS AND FERTILIZERS

*Periods Per Week*

| <i>Class</i> | <i>Practice</i> |
|--------------|-----------------|
| 3            | 1               |

### TEXT:

| <i>Title</i>                 | <i>Author</i>         | <i>Publisher</i> | <i>Price</i> |
|------------------------------|-----------------------|------------------|--------------|
| Soils and Soil Fertility ... | Whitson & Walster ... | Webb .....       | \$1.25       |

### REFERENCES:

| <i>Title</i>  | <i>Author</i>          | <i>Publisher</i>  | <i>Price</i> |
|---|------------------------|-------------------|--------------|
| Soils and Fertilizers .....                         | Snyder .....           | Macmillan .....   | \$1.50       |
| Soils .....   | King .....             | Macmillan .....   | 1.50         |
| Soils .....   | Burkett .....          | Orange-Judd ..... | 1.25         |
| Farm Manures .....                                  | Thorne .....           | Orange-Judd ..... | 1.50         |
| Fertilizers and Crops ....                          | Van Slyke .....        | Orange-Judd ..... | 2.50         |
| Soils and Soil Fertility ..                         | Whitson & Walster .... | Webb .....        | 1.25         |
| Principles of Soil Fertility                        | Vivian .....           | Orange-Judd ..... | 1.00         |
| Irrigation and Drainage..                           | King .....             | Macmillan .....   | 1.50         |
| Soils .....   | Lyon & Fippin .....    | Macmillan .....   | 1.50         |
| Soils and Crops .....                               | Hunt & Burkett .....   | Orange-Judd ..... | 1.50         |
| Soil Fertility and Perma-<br>nent Agriculture ..... | Hopkins .....          | Ginn .....        | 2.25         |

### FARMERS' BULLETINS:

- 44. Commercial Fertilizers.
- 48. Manuring of Cotton.
- 77. Liming of Soils.
- 138. Irrigation in Field and Garden.
- 192. Barnyard Manure.
- 245. Renovation of Worn-out Soils.
- 257. Soil Fertility.
- 266. Management of Soils to Conserve Moisture.
- 278. Leguminous Crops for Green Manuring.
- 371. Drainage of Irrigated Lands.
- 406. Soil Conservation.
- 524. Tile Drainage of the Farm.

### Equipment:

|  | <i>Price</i> |
|--|--------------|
| 1 soil sieve, diameter 2 mm. (No. 9202, Catalogue X, Central Scientific Company) ..... | \$ 1.10      |
| 1 soil auger .....   | 3.00         |
| 1 torsion balance, capacity 1 kilogram.....  | 18.00        |
| 1 platform scale, capacity 100 lbs. or more.....                                       | 5.00         |

|   |          |
|---|----------|
| 3 galvanized pans, with perforated bottoms, size 4 x 4 x 2½ in. deep  | \$ .50   |
| 6 enameled sauce pans, 2 quarts   | .60      |
| 15 enameled pans, diameter 6 in., depth 2 in.   | 1.50     |
| 4 graduated cylinders, 100 cc.  | 2.00     |
| 1 doz. covered soil cans or fruit jars  | .80      |
| 1 spade (Farm Equipment)  | .....    |
| 1 ruler (may be used for straight edge)   | .10      |
| 1 medicine dropper  | .05      |
| 3 glass tubes, diameter 1 inch, length 3 feet   | 1.50     |
| 2 glass tubes, diameter 2 inches, length 15 inches  | 1.00     |
| 1 tamping rod, ¼ inch diameter, 3 feet long   | .....    |
| 1 capillary tube support (No. 9262, Catalogue X, Central Scientific Company, Chicago)                           | .....    |
| 1 500 cc. flask   | .50      |
| 15 sections of water pipe, 8 in., with coupling   | 9.00     |
| 1 barrel or deep water container, 40 inches depth   | .....    |
| 6 mulch cylinders   | 12.00    |
| 18 soil tubes, 3 tube racks, 3 tanks (3 outfits, Nos. 9288-89-90, Catalogue X, Central Scientific Co., Chicago) | 31.50    |
| 18 beakers, 200 cc.   | 2.70     |
| Several yards of cheese cloth   | .50      |
| 1 plasticity apparatus (No. 9146, Catalogue X, Central Scientific Company, Chicago)                             | 2.20     |
| 1 doz. sterilizer bottles   | .45      |
| 1 qt. saturated solution of lime water  | .....    |
| 1 compound microscope (Botany Equipment)  | .....    |
| 1 absorption of heat apparatus (No. 9003, Catalogue X, Central Scientific Company, Chicago)                     | 3.35     |
| Carbon black or soot  | .....    |
| Chalk dust  | .....    |
| 8 chemical thermometers (freezing to boiling)   | 4.80     |
| 2 saucers   | .....    |
| Blue litmus paper   | .50      |
| Quick lime  | .....    |
| Filter paper, diameter 15 cm.   | .60      |
| 9 glass funnels, 3½ inches  | 1.35     |
| Solution of ammonia (dilute 178 cc. saturated ammonia solution with 422 cc. water)                              | .....    |
| Fertilizer materials (required in Experiment No. 21)  | .....    |
| Total   | \$104.60 |

### Practice Work for Course in Soils and Fertilizers with the Apparatus Needed for Each Exercise

The experiments marked thus (\*) will under ordinary conditions be done once for the entire class. Of those not marked the teacher will be guided by the capacity and equipment of the laboratory whether they are to be done by individual students or once for the class. As many sets of apparatus will be

required for each exercise as there are students working individually on such exercises at one time.

Extra pieces of glassware should be kept in stock for emergency.

The catalogue numbers given in certain cases are merely suggestive of the style of apparatus to use and may be made by the students.

Some of the apparatus can be made in the shop or by a local tinner.

- \*1. The identification of rocks.
- \*2. The formation of soils.
- \*3. Classes of soils and the change from soil to subsoil.  
Soil auger.
- 4. a. Determination of total capillary and gravitational water.  
3 galvanized pans with perforated bottom, size  $4 \times 4 \times 2\frac{1}{2}$  high.  
b. Determination of pore space by amount of water held.  
6 enameled pans, 2 quart, 1 graduated cylinder, 100 cc.
- 5. Determination of capillary water capacity of field soils.  
a. Spade.  
b. 3 covered soil cans or fruit jars.  
c. Torsion balance, capacity 1 kilo.
- 6. Compare weight and pore space in sand and clay soils.  
a. One 2-quart sauce pan. (May use (b) under Exp. 2.)  
b. Straight edge. (May use ruler.)  
c. Torsion balance. (Same as (c) in Exp. 5.)
- 7. Volumetric method for determination of specific gravity of soils.  
a. Torsion balance.  
b. 4 graduated cylinders, 100 cc.  
c. Medicine dropper.
- \*8. Determination of rate and height of rise of capillary water.  
a. 3 glass tubes, diam. 1 inch, length 3 feet or more.  
b. Tamping rod  $\frac{1}{4}$  in. diameter.  
c. Capillary tube support. (No. 9262, Catalogue X, Central Scientific Company, Chicago.)  
d. One 500 cc. flask.  
e. 1 ruler, metric and English.
- \*9. Distribution of capillary moisture in soil columns.  
a. 15 8-inch lengths of water pipe with coupling.  
b. Barrel or other water container, depth 40 inches.  
c. 15 enameled pans, diameter 6 inches, depth 2 inches.  
d. Torsion balance.
- \*10. Effect of mulches on rate of evaporation.  
a. 6 mulch cylinders (Nos. 0129, Catalogue X, Central Scientific Company, Chicago).  
b. Cut straw.  
c. Platform scales, capacity 100 lbs. or more.
- \*11. Rate of percolation of water through soils of different textures.  
a. 18 soil tubes, 3 tubs racks, 3 tanks. (3 Nos. 9288-89-90, Catalogue X, Central Scientific Company, Chicago.)
- 12. Effect of drainage on rate of percolation of water through soil.  
a. 2 glass tubes, diameter 2 inches, length 15 inches.  
b. 2 6-inch squares of cheese cloth or wads of cotton.

- c. 2 enameled sauce pans.
- d. 1 beaker, 200 cc.
- 13. Effect of puddling in water holding capacity.
  - a. 2 enameled pans.
  - b. 2 cheese cloth squares, 1 foot.
- 14. Determination of effect of freezing on clay soils.
  - a. Plasticity apparatus. (No. 9146, Catalogue X, Central Scientific Company, Chicago.)
  - b. Torsion balance or platform scales.
- 15. The flocculating effect of lime.
  - a. 1 sterilizer bottle, 8 shaker bottles, 8 oz. (round nursing bottles).
  - b. Saturated solution of lime water. (Keep well stopped.)
  - c. Compound microscope.
- \*16. Effect of color on soil temperature.
  - a. Absorption of heat apparatus. (No. 9003, Catalogue X, Central Scientific Company, Chicago.)
  - b. Carbon black or soot.
  - c. Chalk dust or white marble dust.
  - d. 6 chemical thermometers.
- \*17. Effect of evaporation and soil temperature.
  - a. 4 enameled pans.
  - b. 4 chemical thermometers.
- \*18. Effect of slope on temperature of soils at different depths.
  - a. 8 chemical thermometers (freezing to boiling).
- \*19. To determine when a soil is acid.
  - a. 2 saucers or porcelain dishes.
  - b. Blue litmus paper.
- 20. To determine the effect of lime on the loss of humus.
  - a. Torsion balance.
  - b. Powdered quick lime.
  - c. Filter paper, diameter 15 cm.
  - d. 2 glass funnels, diameter  $3\frac{1}{2}$  in.
  - e. 2 glass beakers.
  - d. Solution of ammonia (178 cc. strong ammonia in 422 cc. water).
- 21. Solubility of common fertilizers.
  - a. Fertilizer materials.
  - b. 9 funnels  $3\frac{1}{2}$  in. or 90 mm.
  - c. Graduated cylinder, 100 cc.
  - d. 18 glass beakers, 200 cc.

Prof. M. E. Sherwin, of the Soils Department in the A. & M. College, at West Raleigh, N. C., will furnish one set of outlines for carrying out the above, to each of the Farm-Life Schools.

## RURAL ECONOMICS

(Marketing, Farm Management, Farm Machinery, Rural Sanitation, etc.)

### *Periods Per Week*

|              |                 |
|--------------|-----------------|
| <i>Class</i> | <i>Practice</i> |
| 3            | 1               |

#### TEXT:

| <i>Title</i>                                      | <i>Author</i> | <i>Publisher</i>  | <i>Price</i> |
|---|---------------|-------------------|--------------|
| How Farmers Coöperate<br>and Double Profits ..... | Poe .....     | Orange-Judd ..... | \$1.50       |

(The text mentioned above is not suited for use as a text for the student, but may be used as a part of a reading course.)

#### REFERENCES:

| <i>Title</i>  | <i>Author</i>           | <i>Publisher</i>    | <i>Price</i> |
|---|-------------------------|---------------------|--------------|
| The Principles of Rural<br>Credit .....             | Morrison .....          | Macmillan .....     | \$1.50       |
| Coöperation in Agricul-<br>ture .....               | Powell .....            | Macmillan .....     | 1.50         |
| Farm Management .....                               | Warren .....            | Macmillan .....     | 1.75         |
| Rural Hygiene .....                                 | Ogden .....             | Macmillan .....     | 1.50         |
| Agricultural Engineering..                          | Davidson .....          | Webb .....          | 1.50         |
| Bacteria in Relation to<br>Country Life .....       | Lipman .....            | Macmillan .....     | 1.50         |
| Principles of Bookkeeping<br>and Farm Accounts .... | Brexell and Nichols ... | American Book Co... | .65          |
| Blanks for above .....                              |                         |                     | .45          |

#### FARMERS' BULLETINS:

- 62. Marketing Farm Produce.
- 242. An Example of Model Farming.
- 272. A Successful Hog and Seed-corn Farm.
- 280. A Profitable Tenant Dairy Farm.
- 292. Cost of Filling Silos.
- 299. Diversified Farming Under the Plantation System.
- 310. A Successful Alabama Diversification Farm.
- 312. A Successful Southern Hay Farm.
- 325. Small Farms in the Cotton Belt.
- 326. Building up a Run-down Cotton Plantation.
- 364. A Profitable Cotton Farm.
- 365. Farm Management in Northern Potato Growing Sections.
- 370. Replanting a Farm for Profit.
- 422. Demonstration Work on Southern Farms.
- 432. How a City Family Managed a Farm.
- 437. A System of Tenant Farming and Its Results.



- 454. A Successful New York Farm.
- 511. Farm Bookkeeping.
- 519. An Example of Intensive Farming in the Cotton Belt.
- 572. A System of Farm Cost Accounting.
- 593. How to Use Farm Credit.
- 179. Horseshoeing.
- 270. Modern Conveniences of the Farm Home.
- 347. The Repair of Farm Equipment.
- 403. The Construction of Concrete Fence Posts.
- 438. Hog Houses.
- 461. The Use of Concrete on the Farm.
- 481. Concrete Construction on the Live-Stock Farm.
- 574. Poultry House Construction.
- 589. Home-made Silos.
- 277. The Use of Alcohol and Gasoline in Farm Engines.
- 303. Corn Harvesting Machinery.
- 155. How Insects Affect Health.
- 345. Some Common Disinfectants.
- 450. Some Facts About Malaria.
- 459. House Flies.
- 463. The Sanitary Privy.
- 478. How to Prevent Typhoid.
- 480. Practical Methods of Disinfecting Stables.
- 547. The Yellow-Fever Mosquito.

DEPARTMENT BULLETINS:

- 3. A Normal Day's Work.
- 32. An Example of Successful Farm Management.
- 41. A Farm Management Survey.
- 57. Water Supply, Plumbing, and Sewage Disposal for Country Homes.

## THE SCHOOL FARM

Make a map of the farm and plan some definite system of cropping. Locate the farm buildings with regard to both convenience and sanitation.

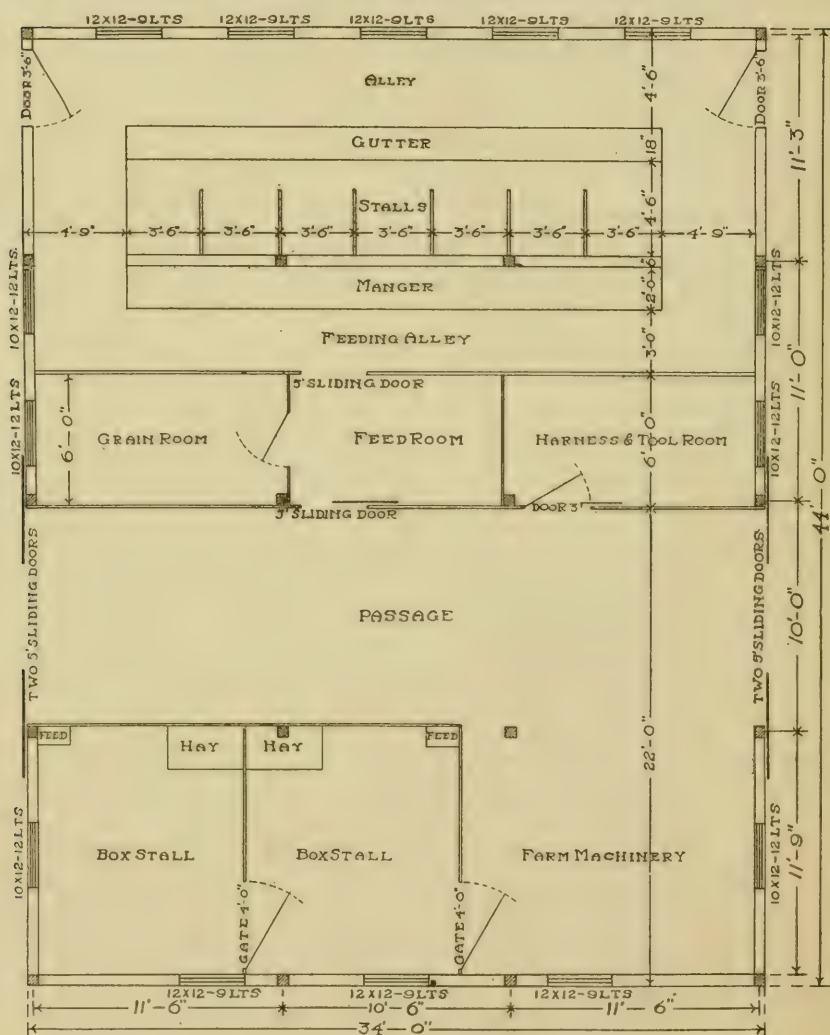


Fig. 13. Barn (Floor Plan).

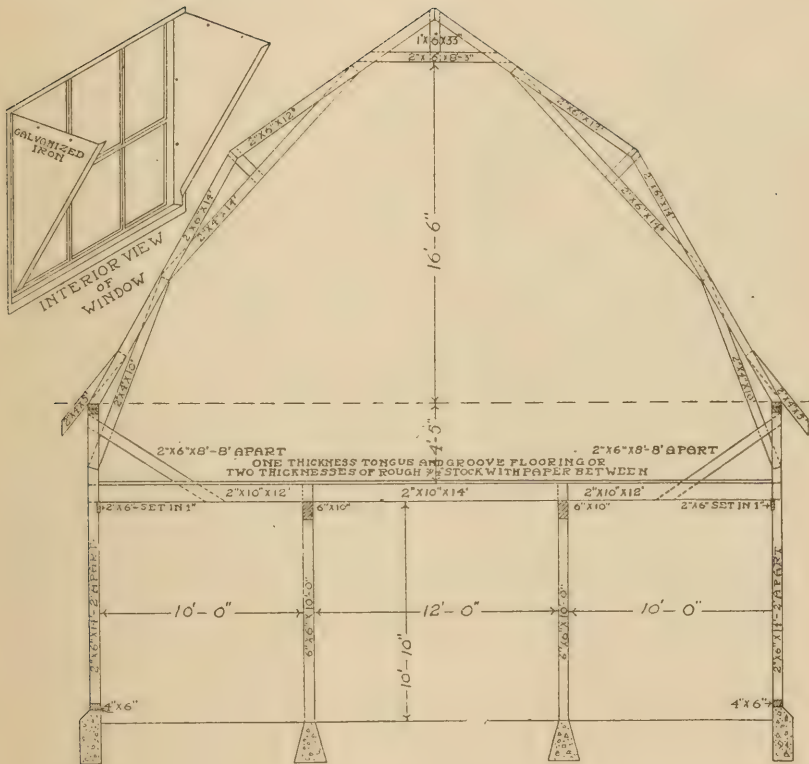


Fig. 14. Barn (Section).

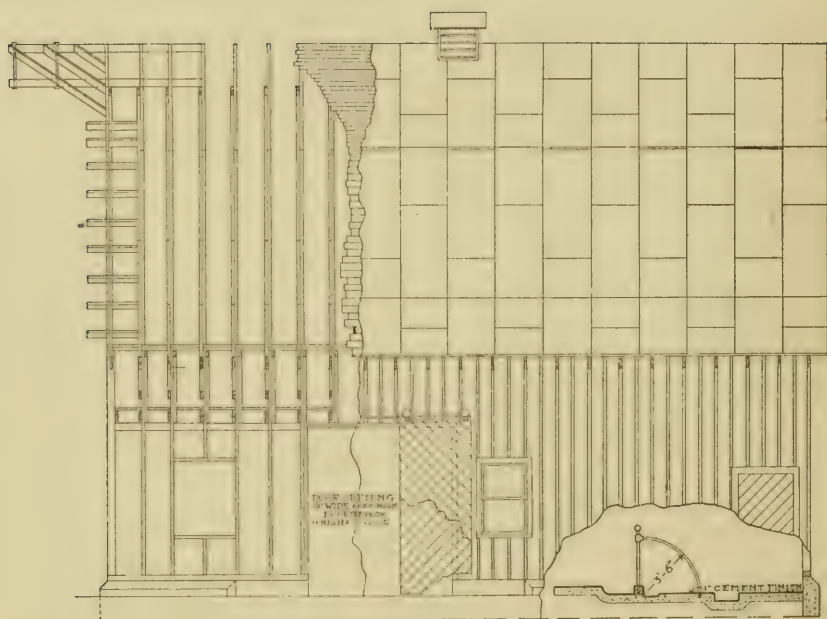


Fig. 15. Barn (Side Elevation).

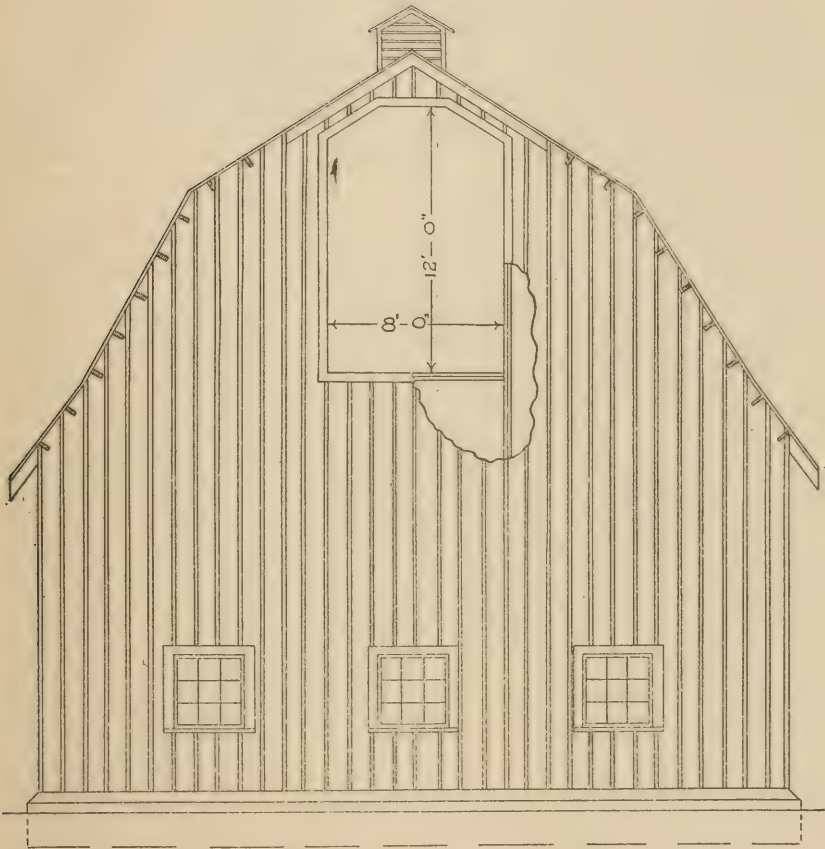


Fig. 16. Barn (End Elevation).

## BILL OF MATERIAL FOR BARN.

- 12 pieces, 4" x 6" x 12'-0" long, for sills
- 80 pieces, 2" x 6" x 14'-0" long, for studs.
- 12 pieces, 6" x 6" x 14'-0" long, for posts.
- 6 pieces, 6" x 6" x 10'-0" long, for posts.
- 18 pieces, 2" x 6" x 18'-0" long, for plates.
- 8 pieces, 6" x 10" x 12'-0" long, for girders.
- 10 pieces, 2" x 6" x 16'-0" long, for ribbon board.
- 138 pieces, 2" x 10" x 12'-0" long, for floor joists.
- 12 pieces, 2" x 6" x 8'-0" long, for wall braces.
- 44 pieces, 2" x 4" x 10'-0" long, for raters and braces.
- 44 pieces, 2" x 4" x 5'-10" long, for rafters and braces.
- 44 pieces, 2" x 4" x 5'-0" long, for rafters and braces.
- 44 pieces, 2" x 6" x 12'-0" long, for rafters and braces.
- 44 pieces, 2" x 4" x 14'-0" long, for rafters and braces.



- 22 pieces, 2" x 6" x 8'-6" long, for rafters and braces.  
 22 pieces, 1" x 6" x 3'-0" long, for rafters and braces.  
 3,080 ft. B.M., size  $\frac{7}{8}$ " x 6"-8"-10" wide, sheathing, for roof.  
 1,870 ft. B.M., size  $\frac{7}{8}$ " x 6"-8"-10" wide, for subfloor.  
 1,870 ft. B.M., T. and G.,  $\frac{7}{8}$ " x 3" wide, for finish floor.  
 3,116 ft. B.M., size  $\frac{7}{8}$ " x 10" wide, for siding.  
 260 pieces,  $\frac{3}{4}$ " x 2" x 14'-0" long, for strips on siding.

**General Equipment:**

|                                     | <i>Price</i> |
|-------------------------------------|--------------|
| 1 barn .....                        | \$ 600.00    |
| 2 work animals (mares) .....        | 500.00       |
| 1 two-horse wagon .....             | 65.00        |
| 1 two-horse turn-plow .....         | 8.50         |
| 1 disc harrow .....                 | 25.00        |
| 1 drag harrow .....                 | 12.00        |
| 1 weeder .....                      | 7.00         |
| 1 cultivator.....                   | 35.00        |
| 1 combination planter .....         | 15.00        |
| 1 single-shovel plow .....          | 3.00         |
| 1 set of two-horse harness .....    | 25.00        |
| 12 hoes (gooseneck) .....           | 9.00         |
| 6 rakes (garden) .....              | 4.50         |
| 2 hay forks .....                   | 1.50         |
| 1 platform scales (merchants) ..... | 15.00        |
| 2 shovels .....                     | 2.00         |
| 1 mattock .....                     | .75          |
| 1 scythe .....                      | 1.50         |
| Total.....                          | \$1,329.75   |

**CARPENTERS' TOOLS FOR GENERAL USE.**

|  |         |
|--|---------|
| 1 hand-saw, 9 points .....   | \$ 1.65 |
| 1 hand-saw, 11 points .....  | 1.65    |
| 1 steel framing square .....   | .75     |
| 1 try-square .....   | .25     |
| 1 bevel square .....   | .25     |
| 1 Stanley spirit level .....   | .75     |
| 1 claw-hammer .....  | .60     |
| 1 jack plane, 14 inches .....  | 2.65    |
| 1 smooth plane, 8 inches .....   | 2.00    |
| 1 block plane, 4 inches .....  | .75     |
| 1 set of screwdrivers .....  | .75     |
| 1 set of firmer chisels (5, $\frac{1}{4}$ to 1 inch) .....                             | 3.50    |
| 1 ratchet brace, 10-inch sweep .....   | 3.00    |
| 1 set Irwin auger bits (12 x 16) .....   | 3.00    |
| 1 set square-shank drill bits for iron (8, $\frac{1}{4}$ - $\frac{1}{2}$ x 16ths)..... | 1.00    |
| 1 iron vise, steel-faced jaws, 24 lbs.....   | 3.00    |
| 1 screw for wood vise .....  | .25     |
| 1 expansion bit, $\frac{1}{2}$ in.....   | 1.50    |
| 1 bench top .....  | .25     |

|   |          |
|---|----------|
| 1 revolving head harness punch .....      | \$ .75   |
| 1 50-foot linen tape .....                | 3.00     |
| 1 rule, 5 feet, folding .....             | .25      |
| 1 set of compass saws .....               | .50      |
| 1 caliper inside, outside .....           | .75      |
| 1 divider .....                           | .25      |
| 1 mechanic's tool-grinder .....           | 5.00     |
| 1 grind-stone, with fixtures .....        | 1.00     |
| 4 steel clamps, 6 inches .....            | 1.00     |
| 1 counter-sink .....                      | .10      |
| 1 drawing knife .....                     | .75      |
| 1 marking gauge.....                      | .25      |
| 1 adjustable hack-saw frame .....         | .60      |
| 12 hack-saw blades .....                  | .60      |
| 1 machine hammer, 8 ounces .....          | .75      |
| 1 oil stone, coarse and medium .....      | .75      |
| 1 pair 8-inch side-cut pliers .....       | .60      |
| 1 pair, 8-inch end-cut pliers .....       | .60      |
| 1 pair 12-inch tinner's snips .....       | 1.25     |
| 1 saw-set .....                           | .75      |
| 1 set steel "S" wrenches .....            | 1.50     |
| 1 monkey wrench, 8-inch.....              | .25      |
| 1 Stilson pipe-wrench, 8-inch .....       | .75      |
| 1 set assorted files and wood rasps ..... | 2.50     |
| 1 spoke shave .....                       | .25      |
| 1 rivet setting punch .....               | .50      |
| 1 cold-chisel, $\frac{1}{2}$ inch .....   | .15      |
| 1 cold-chisel, $\frac{3}{4}$ inch .....   | .25      |
| 1 drift punch .....                       | .25      |
| 1 set nail sets .....                     | .45      |
| 1 steel rivet set .....                   | .25      |
| 1 hatchet .....                           | .75      |
| Total .....                               | \$ 54.90 |

(The following tools are not necessary and may be omitted.)

|   |          |
|---|----------|
| Starret combination square .....  | \$ 4.00  |
| Miter box .....   | 12.00    |
| Set of stocks and dies from 1-16 to 3-4 U. S. standard carriage<br>thread ..... | 12.00    |
| Drill attachment for iron .....   | 3.00     |
| Breast drill .....  | 3.00     |
| Soldering outfit, complete .....  | 6.00     |
| Set blacksmith tools .....  | 35.00    |
| Total .....   | \$ 75.00 |



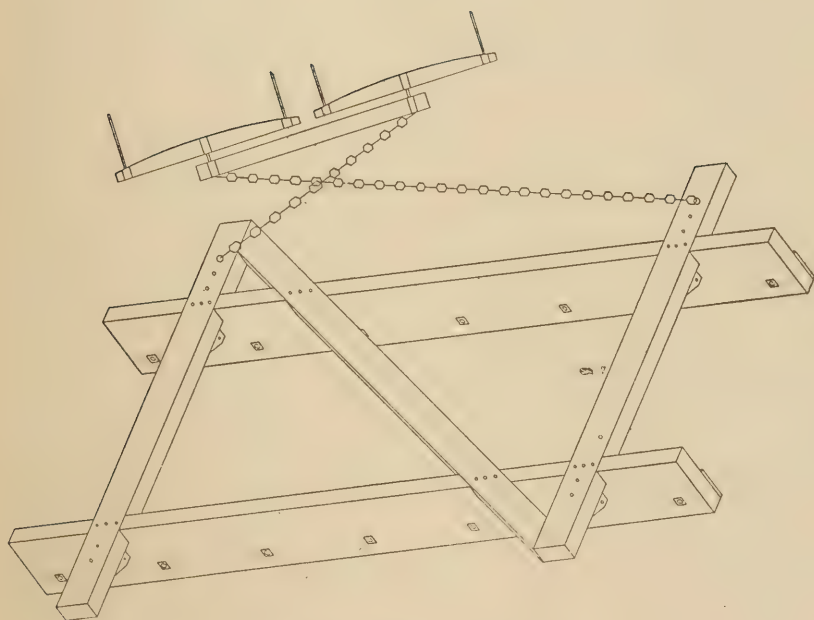


Fig. 19. Road Drag (Perspective).

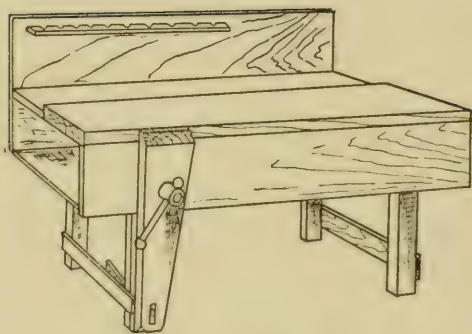


FIG. 1

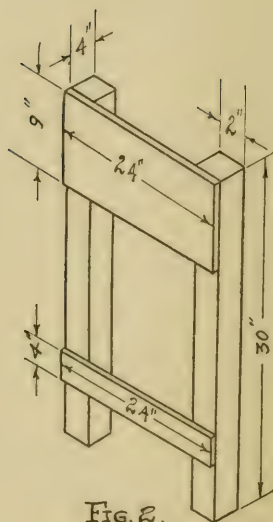


FIG. 2.

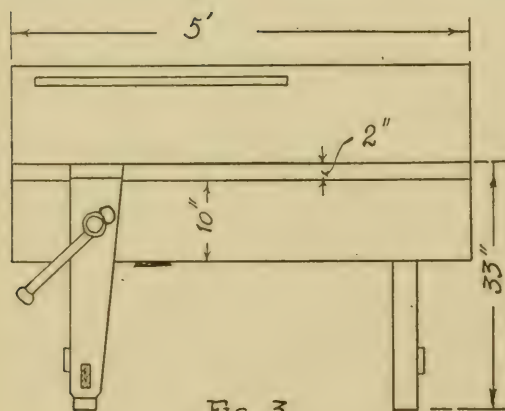


FIG. 3

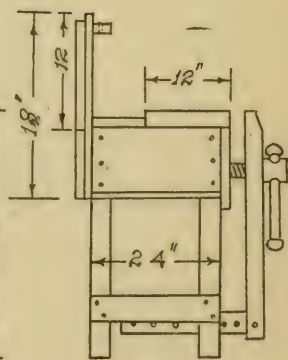


FIG. 4

Plate I. Work Bench.



## WORK BENCH

(Drawing and descriptions furnished by Prof. M. T. Fullan, Auburn, Ala.)

Work benches may be constructed by the schools at a much lower cost than if purchased in the market, and such benches will be as strong and as serviceable as any others. Besides, this will afford constructive work in carpentry which will be of simple nature, giving some idea of construction, at the same time effecting a considerable saving which may be applied to some other equipment.

Fig. 1 gives a view of the finished bench equipped with a simple vise, but any vise which can be obtained may be fitted to the bench. On another sheet will be found details of vises which can be made easily and at a low cost. "Quick-acting" vises are very desirable and where the funds are available it is recommended to purchase them. However, a strong and serviceable vise can be built by the class which will serve the purpose very well, although it is much slower in action.

Fig. 2 shows how the supports are built up, and Figs. 3 and 4 give respectively the side and end view of the finished bench. A bench of this type was constructed by two men (teachers) in four hours, at a cost of \$1.50 for the material. This included 40 cents for a screw for vise.

This type of bench is to be placed against the wall. The tool back may be omitted when the bench is placed out in the room and another vise may be fitted on the opposite side, diagonally across from the vise shown. It is noted that there are two receptacles formed at each end of the bench which will serve to hold tools. These may be fitted with the hinged cover if desired (not shown in drawing). Also, a shelf may be placed across underneath the bench resting on the 1" x 4" braces. This will be found of service to take care of the longer tools or pieces of stock material, thus keeping them off of the working surface.

The back may be made to suit the taste of the constructor and is intended to be a support for the tool rack. It is stiffened by battens 1" x 3" x 18".

### BILL OF MATERIAL

- 1 piece, 2" x 12" x 5', for top.
- 4 pieces, 2" x 4" x 30", for legs.
- 2 pieces, 1" x 9" x 24".
- 2 pieces, 1" x 4" x 24".
- 1 piece, 1" x 10" x 5'.
- 1 piece, 1" x 12" x 5', for back.
- 1 piece, 1 x 6" x 5', for back.
- 2 pieces, 1" x 3" x 18", for battens.
- 2 pieces, 1" x 8" x 24".

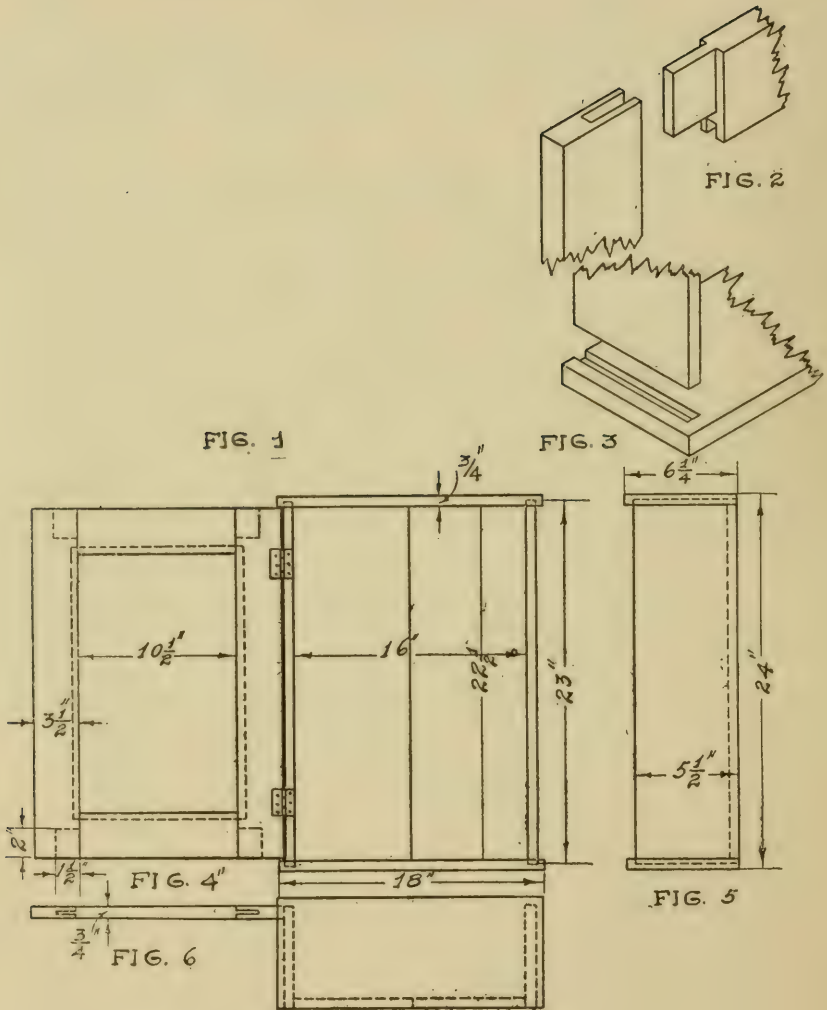


Plate II. Wall Tool Cabinet.



### WALL TOOL CABINET

(Drawing and Description furnished by Prof. M. T. Fullan, Auburn, Ala.)

A wall cabinet for holding tools can be easily made and is much better in many ways than drawers for this purpose. Edged tools, when placed in a drawer, are likely to suffer, due to the edges coming in contact with other tools. This objection is not found in the wall cabinet, as screw hooks can be placed so as to prevent the edges coming in contact.

Fig. 1 shows the cabinet with tools placed in it and is given as a suggestion for arranging tools in a similar cupboard. The dimensions are shown in the views in Figs. 4, 5, and 6, while the details of construction are given in Figs. 2 and 3.

The sides are planed and edged to the measurements given and the top and bottom joined to the sides with the "house" or "gain" joint shown in Fig. 3, gluing and nailing the pieces or fastening them with screws. The back is to be made of two pieces of material fitted as indicated in the drawing.

The door is built with a frame and panel. The frame is joined as shown in Fig. 2, with the slip-mortise and tenon joint. The inner face is grooved out to receive the panel, which is about 5-16" thick. All the four joints of the frame are to be properly fitted and the groove made afterwards. Then, the frame should be put together temporarily and measurement made for the panel, allowing about a sixteenth of an inch all around the panel for swelling of the lumber. A panel fitted too tight will invariably cause the frame to become broken in damp weather. The joints should then be coated with glue and the frame put together with the panel in position and clamped. Before

gluing up, the panel and frame should be planed and smoothed, ready for stain. The door is secured to the body by means of butt hinges, as shown in the drawing. A lock may be added in the form of a rim cupboard lock or a simple hasp and staple with the padlock.

After the surface of the cabinet is well worked with sandpaper, using Nos.  $1\frac{1}{2}$ , 1, 0, a coat of oil stain is applied. After 24 hours a coat of wax or varnish is given the entire surface.

#### BILL OF MATERIAL

|   |   |
|---|---|
| 2 pieces, $\frac{3}{4}$ " x $5\frac{1}{2}$ " x 23".               | 2 pieces, $\frac{3}{4}$ " x $6\frac{1}{4}$ " x 18". |
| 2 pieces, $\frac{3}{4}$ " x $3\frac{1}{2}$ " x $22\frac{1}{2}$ ". | 2 pieces, $\frac{3}{4}$ " x 8" x $22\frac{1}{2}$ ". |
| 1 piece, 5-16" x 11" x $16\frac{1}{2}$ ".                         | 2 pieces, $\frac{3}{4}$ " x $3\frac{1}{2}$ " x 14". |

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